

CMP

Congestion Management Process 2021 Annual Regional Congestion Report

St. Louis Metropolitan Area
April, 2022

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EAST-WEST GATEWAY
Council of Governments
Creating Solutions Across Jurisdictional Boundaries

2021

Annual Regional Congestion Report

“The opinions, findings and conclusions expressed in this publication are those of the authors and not necessarily those of the Missouri Highways and Transportation Commission, the Illinois Department of Transportation, the Federal Highway Administration or the Federal Transit Administration.”

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Introduction

The regional Congestion Management Process (CMP) is a systematic and regionally accepted approach for managing congestion that provides accurate and up-to-date information on transportation system performance. As an MPO for the St. Louis region with a population over 2,000,000, East-West Gateway is required to maintain a CMP as part of its ongoing transportation planning process.

The CMP is intended to be a systematic way of monitoring, measuring and diagnosing the causes of current and future congestion on a region's multi-modal transportation systems; evaluating and recommending alternative strategies to manage current and future regional congestion; and monitoring and evaluating the performance of strategies implemented to manage congestion.

The purpose of the MPO transportation planning process is to comprehensively consider possible strategies, evaluate projects from diverse viewpoints, and meaningfully involve key stakeholders to support strategic regional choices in congestion management, such as improving roadways, expanding transit capacity, encouraging bicycling, and ensuring safe walking environments. These congestion management strategies provide a connecting tissue between the Long-Range Transportation Plan (LRTP), the Transportation Improvement Plan (TIP), and the Regional Intelligent Transportation System (ITS) Architecture. The CMP is strongly connected to the LRTP by providing a set of congestion management objectives, performance measures, and strategies that make the plan comprehensive.

The CMP provides system performance information for evaluating projects nominated for inclusion in the TIP and the CMP objectives are integrated with the application scoring and prioritization process. Transportation systems management and operation for congestion management are implemented through Intelligent Transportation Systems (ITS) such as traffic signal improvements; traveler information projects; electronic fare systems, Automatic Vehicle Identification (AVI), and Automatic Vehicle Location (AVL) technologies. Also, proposed ITS projects are required to be consistent with the regional CMP strategies.

The HERE data set was used to analyze the identified performance measures. HERE is a private vendor that provides mapping data and related services to individuals and companies. MODOT has contracted with HERE for access to their data and the use of the Regional Integrated Transportation Information System (RITIS). RITIS is an automated data sharing, dissemination, and archiving system that includes many performance measures, dashboard, and visual analytics tools housed at the University of Maryland.

MODOT's contract provides the same access to Missouri MPOs, which gives EWG the ability to analyze the HERE data set for the entire eight-county region. Three performance measures were analyzed in this study. These are Speed Index (SI), Planning Time Index (PTI), and Travel Time Index (TTI). These performance measures are defined below:

- Speed Index is the ratio of average speeds to 85th-percentile speeds of a segment. Speed Index was used to identify possible congested freeways.

- Travel Time Index is Travel Time represented as a percentage of the ideal travel time. For example, a TTI value of 1.2 means travel time during peak period is 20% longer than the free-flow travel time between the same origin and destination.
- Planning Time Index is the total travel time that should be planned when extra time (buffer time) is included in the trip. For example, a Planning Time Index of 1.60 means that, for a 15-minute trip, the total time that should be planned for the trip to ensure on-time arrival is 24 minutes (15 minutes x 1.60 = 24 minutes). In this scenario, the buffer time alone is 9 minutes (15 minutes x 0.6 percent). The higher the Planning Time Index, the more unreliable travel time is.

The 2021 Regional Congestion Report is comprised of five parts. These are: definition of the congested network, regional congestion analyses (for freeways and arterials), Covid-19 impact, evaluation of mobility-enhancing strategies, and a conclusion that notes a broader outlook for regional congestion.

Scope of CMP Network Congestion Analysis

The CMP network consists of Interstates, other Freeways and Expressways, and Principal Arterials included in the National Highway System (NHS). This analysis is limited to the core urban and suburban areas of the St. Louis region where congestion is prevalent on a regular, recurring basis. For the purposes of this analysis, the morning peak-period is from 6 am to 9 am and the evening peak period is from 3 pm to 6 pm. All performance measures are calculated and compared based on congestion data from these time periods.

The process of identifying the congested network for this analysis involved a detailed visual inspection of Speed Index congestion on all NHS roadways in the region. This index is the ratio of average speeds to 85th-percentile speed, which represents free-flow speeds. Four thresholds are applied to the Speed Index to reveal the various categories of congestion from the system for both arterials and freeways.

Congested location selection process is as follows:

- locations that met or exceeded thresholds for congestion are identified,
- short congested sections of the arterials where length of congestion was 0.3 miles or less were eliminated from the selection.

1 Regional Freeway and Arterial Congestion Analyses

This section covers the spatial analysis of the congested freeways and arterials, overview of the selected congested locations, and congestion performance analyses.

1.1 Congested CMP Network

The scope of analysis of the freeway system on the Missouri side of the region consisted of all Interstate highways and other freeways in St. Louis City, St. Louis County and St. Charles County. On the Illinois side, the freeways analyzed were I-255, from I-270 south to the Missouri State line, along with all interstates east of I-255 to the Missouri state line in St. Clair and Madison County. The limits that were chosen include the locations where congestion exists on a regular recurring basis on the Interstate highways and other freeways in our region.

Arterial operations vary widely in different parts of the region based on the population density and land use. For this reason, this report looks at the congested arterial locations separately for each area of the region. The intent is to supply each jurisdiction with the status of arterial operations so that they can determine how best to address their arterial congestion issues. The spatial distribution of the regional freeway and arterial network is shown in Figure 1.

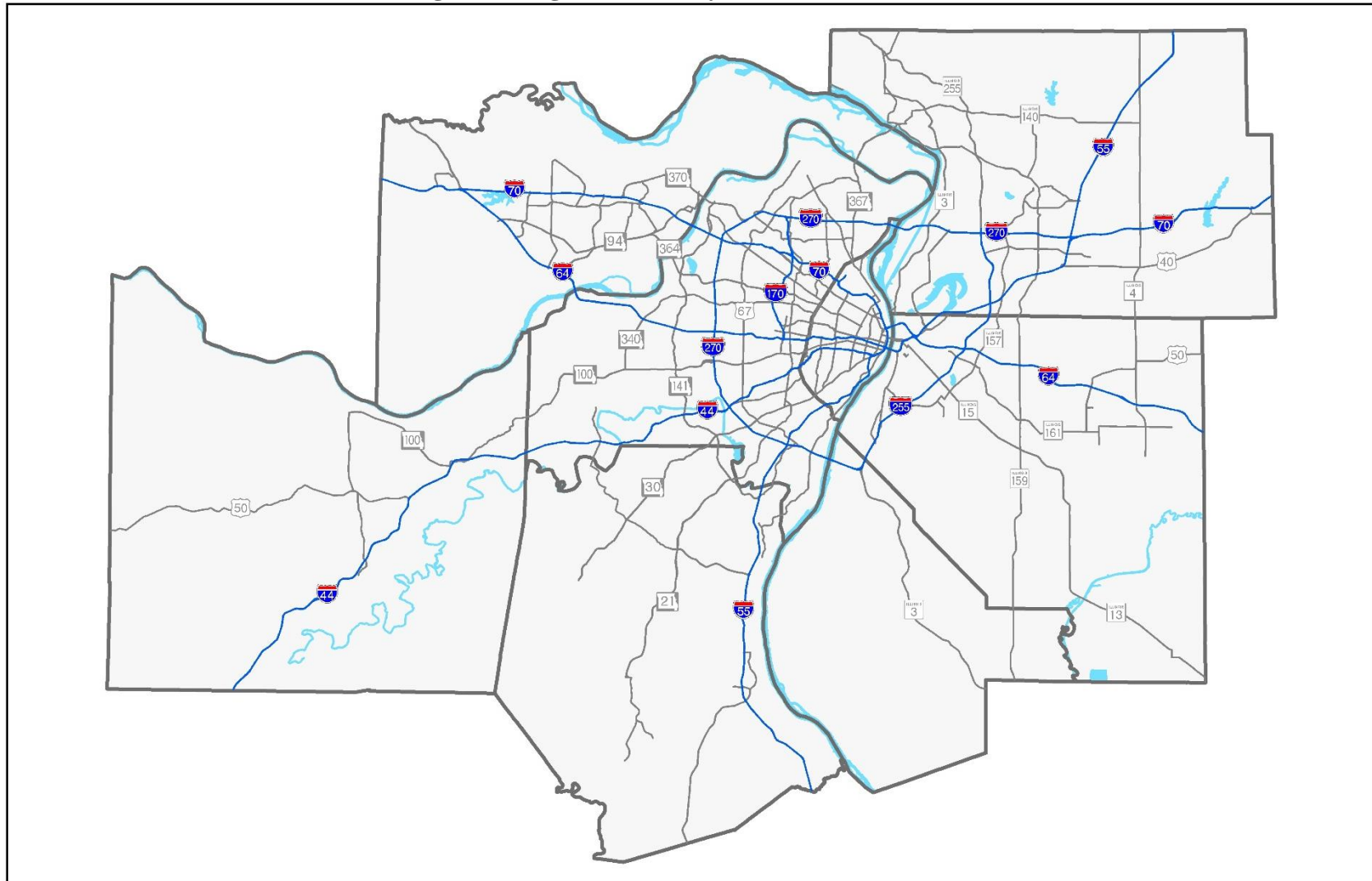
Freeways

A total of 569.2 directional miles of freeway were selected for the regional analysis, which includes the mileage of both directions of travel for each segment of road. The analysis determined that 5.2 miles, 0.9% of total miles, were considered congested during morning peak, and 53.5 miles, 9.4% of total miles, during evening peak hours. A breakdown of how the total congested miles are distributed across the region is shown in Table 1.

Table 1: Comparison of Regional and Congested Freeway Miles



County	Congested Network (AM & PM)		AM Congestion		PM Congestion	
	Miles	Percent	Miles	Percent	Miles	Percent
St. Louis City	9.3	15.8%	1.1	21.2%	8.2	15.3%
St. Louis	27.5	46.8%	3.7	71.2%	23.8	44.5%
St. Charles	13	22.1%	0	0.0%	13	24.3%
IL	8.8	15.0%	0.4	7.7%	8.4	15.7%
Total	58.7	100%	5.2	100%	53.5	100%

Figure 1: Regional Freeway and Arterial Network



Regional Network

East-West Gateway Region
March 2022

- | | |
|--|---|
| Regional Network | Other Map Data |
|  Interstate / Freeway |  County Boundary |
|  Major Arterial |  River / Lake |



Sources: Federal Highway Administration, Here Data;
East-West Gateway Council of Governments



Arterials

Our analysis identified a total of 51.2 miles on the regional arterial network that were considered congested in the morning and evening peak periods. A comparison of congested miles by county is shown in Table 2. St. Louis is ranked as the most congested percentage wise.

Table 2: Comparison of Regional and Congested Arterial Miles

County	Congested Network	
	Miles	Percent
St. Louis City	15.9	31.1%
St. Louis	17	33.2%
St. Charles	7.5	14.6%
Jefferson	1.2	2.3%
IL	9.6	18.8%
Total	51.2	100.0%

1.2 Selected Congested Locations

The tables in this section provide information on queue length, TTI, PTI, severity, and delay impact for the congested locations.

Severity and delay impact are defined as:

- The severity is the average of the TTI and PTI. It takes into account two aspects of congestion; the average delay of a congested location and how reliable the average travel time is from day to day. Higher severity numbers reflect more severe congestion.
- The delay impact is obtained by multiplying the congested miles of a location by the TTI. Its purpose is to compare the impact of delay to motorists, by factoring in the comparative lengths of the queues in each congested location.

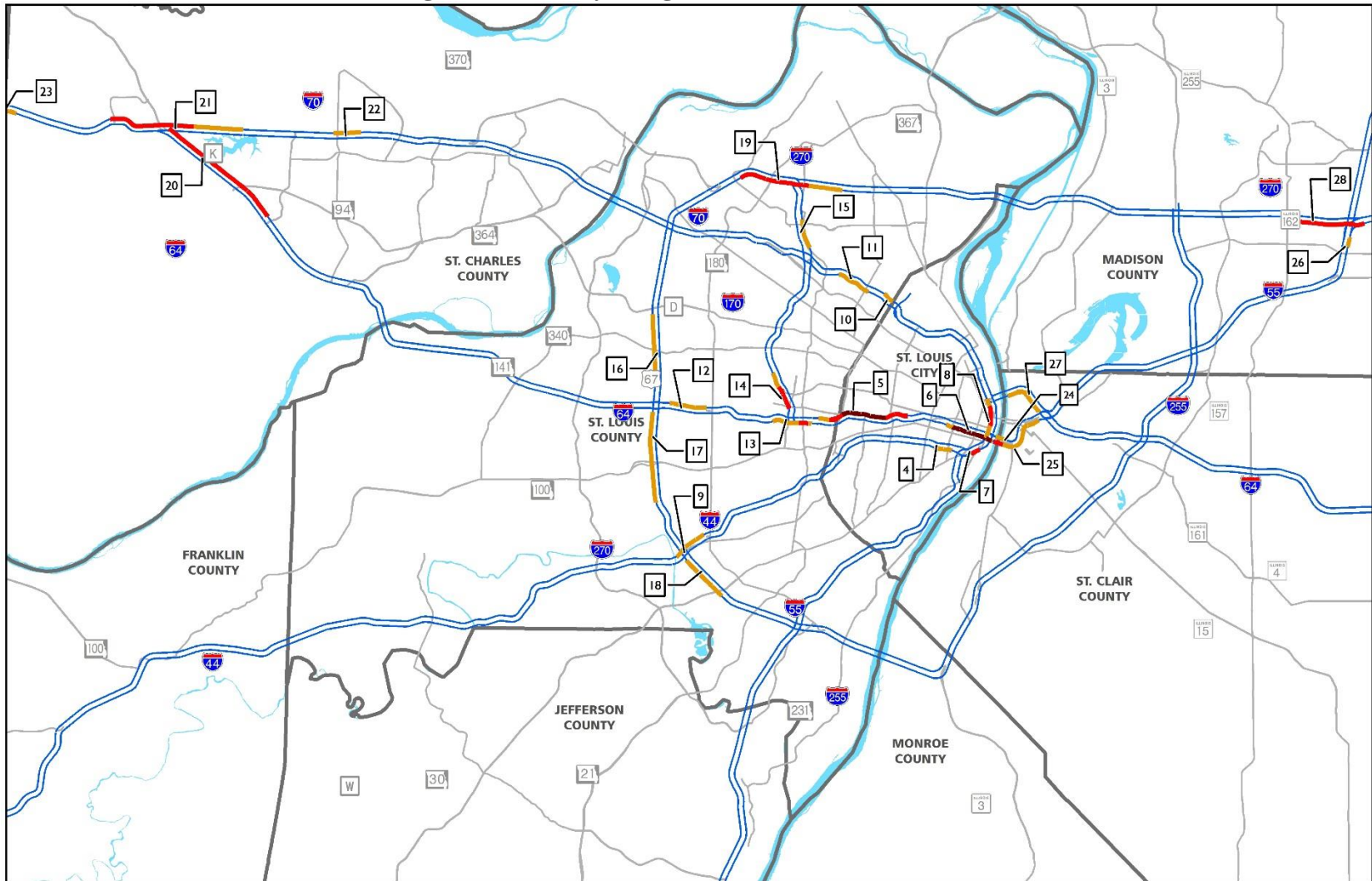
Freeways

Our freeway analyses resulted in the selection of 58.7 miles of congested locations: 9.3 miles in the city of St. Louis, 27.5 miles in St. Louis County, 13 miles in St. Charles County, and 8.8 miles in Illinois. Table 3 lists the identified congested locations along with their performance measures during the AM and PM peaks. The maps in Figures 2 and 3 show the location of selected congested freeways, ranked by level of congestion based on speed index in the AM and PM peaks.

Table 3: Congested Freeway Locations

Map No	Route	Limits	State	County	Direction	Peak	Queue Length	PTI	TTI	Severity	Delay Impact
1	I-64	Hampton Ave to McCausland Ave	MO	St Louis City	WB	AM	1.08	2.21	1.13	1.67	1.23
4	I-44	Compton Ave to Jefferson Ave	MO	St Louis City	EB	PM	0.73	1.75	1.12	1.44	0.82
5	I-64	S Boyle Ave to Big Bend Blvd	MO	St Louis City/County	WB	PM	3.94	2.73	1.56	2.15	6.14
6	I-64	Ewing Ave to Poplar St Bridge	MO	St Louis City	EB	PM	2.07	9.29	3.05	6.17	6.33
7	I-55	Lafayette Ave to 7th St	MO	St Louis City	NB	PM	0.44	3.93	1.59	2.76	0.69
8	I-44	I-64 to I-70	MO	St Louis City	EB	PM	1.84	2.65	1.26	1.96	2.31
2	I-270	MO-367 to Washington St	MO	St Louis	WB	AM	3.69	2.79	1.23	2.01	4.53
9	I-44	Kirkwood Rd to I-270	MO	St Louis	WB	PM	1.49	2.22	1.19	1.71	1.78
10	I-70	Goodfellow Blvd to Jennings Station Rd	MO	St Louis	WB	PM	0.52	2.12	1.15	1.64	0.60
11	I-70	MO-N to MO-U	MO	St Louis	EB	PM	1.52	1.35	1.19	1.27	1.81
12	I-64	Lindbergh Blvd to New Ballas Rd	MO	St Louis	WB	PM	1.58	1.78	1.15	1.47	1.82
13	I-64	McKnight Rd to Boland Pl	MO	St Louis	EB	PM	1.71	2.48	1.19	1.84	2.03
14	I-170	Delmar Blvd to Clayton Rd	MO	St Louis	SB	PM	1.67	2.98	1.37	2.18	2.29
15	I-170	I-70 to Airport Rd	MO	St Louis	NB	PM	1.30	1.72	1.13	1.43	1.47
16	I-270	Page Ave to Ladue Rd	MO	St Louis	SB	PM	2.86	1.99	1.23	1.61	3.52
17	I-270	I-64 to Dougherty Ferry Rd	MO	St Louis	SB	PM	3.81	2.10	1.16	1.63	4.42
18	I-270	I-44 to Gravois Rd	MO	St Louis	SB	PM	2.10	1.76	1.15	1.46	2.42
19	I-270	James S McDonnell Blvd to Washington St	MO	St Louis	EB	PM	4.48	2.33	1.33	1.83	5.95
20	I-64	Winghaven Blvd to I-70	MO	St Charles	WB	PM	5.59	3.47	1.59	2.53	8.89
21	I-70	Lake St Louis Blvd to Wentzville Pkwy	MO	St Charles	WB	PM	5.70	2.48	1.37	1.93	7.81
22	I-70	Tr Hughes Blvd to MO-K	MO	St Charles	WB	PM	1.19	2.07	1.16	1.62	1.38
23	I-70	St. Charles/Warren County Line to MO-W	MO	St Charles	EB	PM	0.55	1.31	1.22	1.27	0.67
3	I-64	Poplar St Bridge	IL	IL	EB	AM	0.42	1.35	1.16	1.26	0.49
24	I-64	Poplar St Bridge	IL	IL	WB	PM	0.43	1.41	1.12	1.27	0.49
25	I-64	Poplar St Bridge to I-55/64/70 E Split	IL	IL	EB	PM	2.49	1.47	1.19	1.33	2.96
26	I-55/I-70	Edwardsville Rd to I-55/I-70 Split	IL	IL	EB	PM	0.50	1.32	1.18	1.25	0.60
27	I-70	Stan Musial Bridge to I-55/I-64 Exit	IL	IL	SB	PM	1.91	1.88	1.18	1.53	2.26
28	I-270	IL-159 to I-55	IL	IL	EB	PM	3.04	2.00	1.25	1.63	3.80
Total							58.7				

Figure 3: Freeway Congested Locations (PM Peak)



Congested Locations

Freeways - PM Peak

East-West Gateway Region
March 2022

Freeway Congestion

- Severe
- Heavy
- Moderate
- Uncongested

Other Map Data

- Major Arterial
- County Boundary
- River / Lake



Sources: Federal Highway Administration, Here Data;
East-West Gateway Council of Governments



EAST-WEST GATEWAY
Council of Governments

Arterials

Our analyses resulted in the selection of 51.2 miles of congested locations: 15.9 miles in the city of St. Louis, 17 miles in St. Louis County, 7.5 miles in St. Charles County, 1.2 miles in Jefferson County, and 9.6 miles in Illinois counties. The tables 4 through 8 show the identified congested locations along with their performance measures during the AM and PM peaks for each county. Figures 4a through 5b, show the location of selected congested arterials for morning and evening peak periods.

Table 4: St. Louis City

No	Map No	Route	Limits	State	Direction	Peak	Queue Length	PTI	TTI	Severity	Delay Impact
1	1	Grand Blvd	Hall St to I-70	MO	SB	AM	0.39	2.22	1.61	1.92	0.63
2	2	Grand Blvd	Chouteau Ave to Park Ave	MO	SB	AM	0.38	2.30	1.42	1.86	0.54
3	3	Salisbury St	Florissant Ave to I-70	MO	EB	AM	0.49	2.30	1.40	1.85	0.68
4	4	Kingshighway Blvd	I-64 to MO-100	MO	SB	AM	0.32	2.25	1.54	1.90	0.49
5	5	Kingshighway Blvd	I-64 to Laclede Ave	MO	NB	AM	0.60	2.22	1.54	1.88	0.92
6	8	Cole St	I-44 to Tucker Blvd	MO	WB	PM	0.55	2.29	1.61	1.95	0.89
7	9	Cole St	Tucker Blvd to I-44	MO	EB	PM	0.49	1.96	1.46	1.71	0.71
8	10	Forest Park	Kingshighway Blvd to Vandeventer Ave	MO	EB	PM	1.30	1.69	1.37	1.53	1.78
9	11	Grand Blvd	Hall St to I-70	MO	SB	PM	0.39	2.22	1.84	2.03	2.40
10	12	Grand Blvd	Chouteau Ave to Park Ave	MO	SB	PM	0.38	3.29	1.62	2.46	0.62
11	13	Grand Blvd	I-64 to Lindell Blvd	MO	NB	PM	0.38	2.11	1.53	1.82	0.58
12	14	Grand Blvd	Gravois Ave to Arsenal St	MO	NB	PM	0.71	1.86	1.44	1.65	0.54
13	15	Hampton Ave	Watson Ave to I-44	MO	NB	PM	0.60	1.83	1.47	1.65	0.89
14	16	Jefferson Ave	Washington Blvd to Market St	MO	SB	PM	0.30	2.36	1.62	1.99	0.49
15	17	Jefferson Ave	Market St to Washington Blvd	MO	NB	PM	0.30	1.92	1.41	1.67	0.43
16	18	Salisbury St	Florissant Ave to I-70	MO	EB	PM	0.49	3.29	2.01	2.65	0.98
17	19	Kingshighway Blvd	Lindell Blvd to MO-100	MO	SB	PM	1.28	2.57	1.67	2.12	2.14
18	20	Kingshighway Blvd	MO-100 to Laclede Ave	MO	NB	PM	1.07	2.36	1.55	1.96	1.66
19	21	Market St	18th St to Jefferson Ave	MO	WB	PM	0.51	1.92	1.42	1.67	0.72
20	22	Market St	14th St to 7th St	MO	EB	PM	0.50	2.46	1.59	2.03	0.79
21	23	MO-100	Vandeventer Ave to Kingshighway Blvd	MO	WB	PM	0.96	2.08	1.67	1.88	1.60
22	24	MO-100	Truman Pkwy to Tucker Blvd	MO	EB	PM	0.33	2.44	1.52	1.98	0.50
23	25	MO-100	Kingshighway Blvd to Vandeventer Ave	MO	EB	PM	0.96	2.00	1.63	1.82	1.56
24	26	MO-D	Goodfellow Blvd to Skinker Pkwy	MO	WB	PM	0.44	1.80	1.38	1.59	0.61
25	27	Skinker Blvd	Delmar Blvd to Forest Park Pkwy	MO	SB	PM	0.43	3.13	1.85	2.49	0.79
26	28	Skinker Blvd	Forest Park Pkwy to Delmar Blvd	MO	NB	PM	0.43	2.00	1.51	1.76	0.64
27	29	Tucker Blvd	I-70 to 13th Ave	MO	SB	PM	0.34	2.20	1.45	1.83	0.49
28	30	Tucker Blvd	Cole St to Market St	MO	SB	PM	0.57	1.92	1.50	1.71	0.85
Total							15.9				

Table 5: St. Louis County

No	Map No	Route	Limits	State	Direction	Peak	Queue Length	PTI	TTI	Severity	Delay Impact
1	31	St Ferdinand St	Lindbergh Blvd to Washington St	MO	SB	PM	0.44	2.16	1.54	1.85	0.67
2	32	US-67	New Halls Ferry Rd to New Florissant Rd	MO	SB	PM	1.11	1.88	1.4	1.64	1.56
3	33	US-67	St Ferdinand St to Washington St	MO	SB	PM	0.67	3.2	1.77	2.49	1.19
4	34	US-61	Big Bend Rd to I-44	MO	SB	PM	0.52	1.76	1.37	1.57	0.71
5	35	US-61	I-55 to Lemay Ferry Rd	MO	SB	PM	0.59	1.94	1.56	1.75	0.92
6	36	US-67	New Florissant Rd to Old Halls Ferry Rd	MO	NB	PM	2.19	1.97	1.56	1.77	3.41
7	37	US-67	Washington St to Patterson Rd	MO	NB	PM	0.37	2.14	1.52	1.83	0.56
8	38	US-61	Lemay Ferry Rd to I-55	MO	NB	PM	0.67	1.73	1.37	1.55	0.92
9	39	MO-21	Lindbergh Blvd to Butler Hill Rd	MO	SB	PM	2.61	2.19	1.6	1.90	4.18
10	40	MO-21	Butler Hill rd to I-270	MO	NB	PM	1.50	2.01	1.57	1.79	2.35
11	41	MO-30	Sappington Rd to Lindbergh Blvd	MO	WB	PM	0.34	2.38	1.64	2.01	0.55
12	42	MO-30	Lindbergh Blvd to Sappington Rd	MO	EB	PM	0.34	2.29	1.66	1.98	0.56
13	43	MO-100	McCausland Ave to Big Bend Blvd	MO	WB	PM	0.83	1.69	1.42	1.56	1.18
14	44	MO-100	MO-141 to Baxter Rd	MO	WB	PM	0.60	2.69	1.67	2.18	1.01
15	45	MO-100	MO-340 to Old State Rd	MO	WB	PM	0.54	2.11	1.62	1.87	0.87
16	46	MO-100	Big Bend Blvd to McCausland Ave	MO	EB	PM		2	1.7	1.85	1.41
17	47	MO-100	Henry Ave to Woods MO-141	MO	EB	PM	0.45	2.31	1.67	1.99	0.76
18	48	MO-100	Old State Rd to MO-340	MO	EB	PM	0.54	1.72	1.36	1.54	0.73
19	49	MO-340	Chesterfield Pkwy to Baxter Rd	MO	SB	PM	0.38	2.69	1.81	2.25	0.69
20	50	MO-366	Lindbergh Blvd to Geyer Rd	MO	WB	PM	0.44	1.84	1.36	1.60	0.59
21	51	MO-AC	Old Halls Ferry Rd to Dunn Rd	MO	NB	PM	0.69	3.43	1.74	2.59	1.20
22	52	MO-D	I-170 to Woodson Rd	MO	WB	PM	0.36	2.21	1.55	1.88	0.55
Total							17				

Table 6: St. Charles

No	Map No	Route	Limits	State	Direction	Peak	Queue Length	PTI	TTI	Severity	Delay Impact
1	53	Mexico Rd	I-70 to Jungermann Rd	MO	WB	PM	0.88	2.24	1.57	1.91	1.38
2	54	Mid Rivers Mall Dr	MO-364 to Central School Rd	MO	NB	PM	0.51	2.22	1.58	1.90	0.80
3	55	MO-94	5th St to I-70	MO	SB	PM	1.99	1.79	1.45	1.62	2.88
4	56	MO-94	Friedens Rd to Pralle Ln	MO	SB	PM	0.61	2.15	1.41	1.78	0.86
5	57	MO-K	I-70 to MO-364	MO	SB	PM	3.50	1.89	1.49	1.69	5.22
Total							7.5				

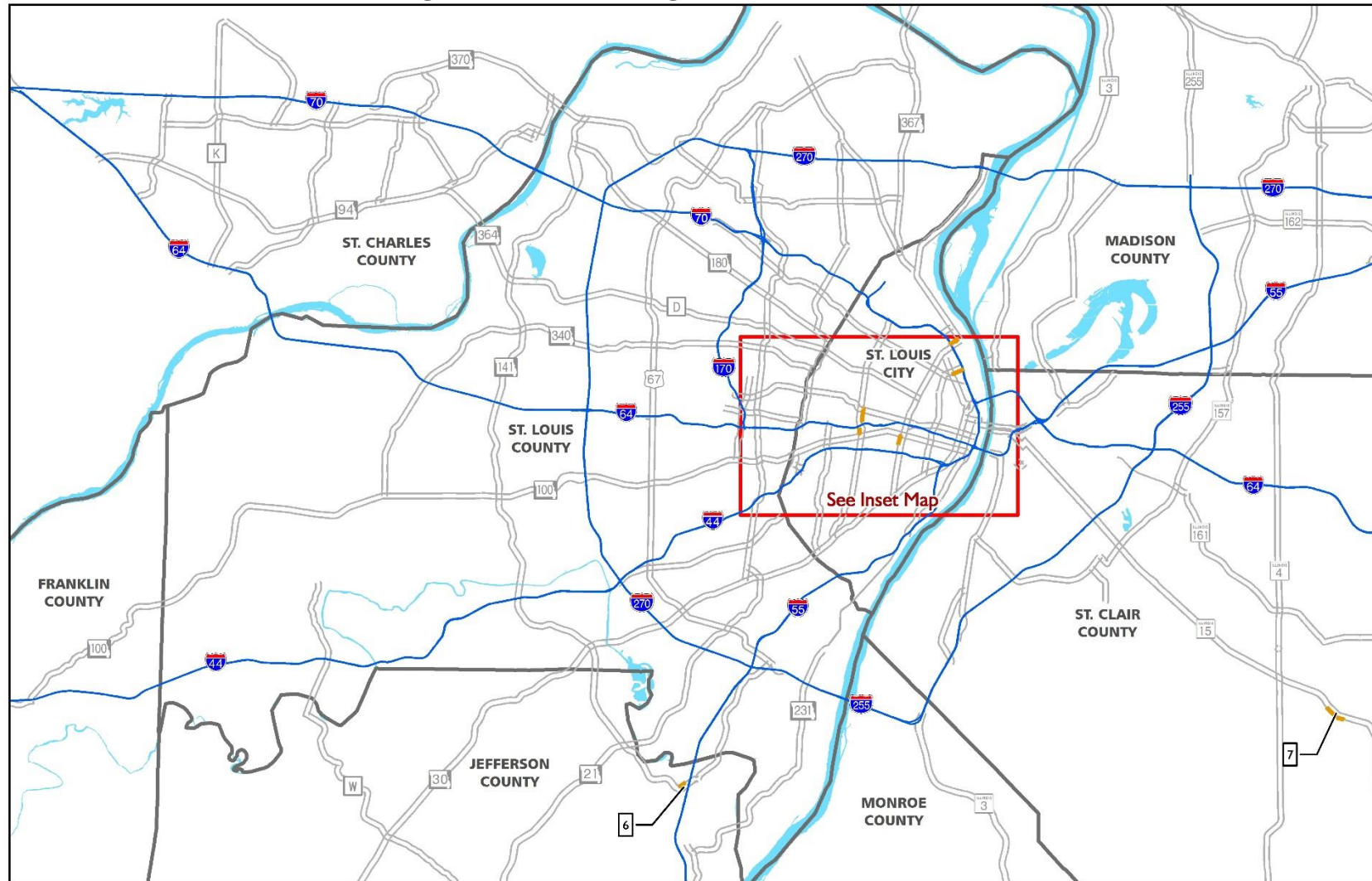
Table 7: Jefferson

No	Map No	Route	Limits	State	Direction	Peak	Queue Length	PTI	TTI	Severity	Delay Impact
1	6	MO-141	Old Lemay Ferry Rd to I-55	MO	NB	AM	0.37	1.88	1.38	1.63	0.51
2	58	MO-141	Old Lemay Ferry Rd to Jeffco Blvd	MO	NB	PM	0.84	2.07	1.62	1.85	1.36
Total							1.2				

Table 8: Illinois

No	Map No	Route	Limits	State	Direction	Peak	Queue Length	PTI	TTI	Severity	Delay Impact
1	7	IL-15	IL-13 to Green Mount Rd	IL	EB	AM	0.77	2.25	1.45	1.85	1.12
2	59	IL-15	IL-13 to Green Mount Rd	IL	EB	PM	0.77	2.16	1.55	1.86	1.20
3	60	IL-159	I-64 to Frank Scott Pkwy	IL	SB	PM	1.80	2.25	1.64	1.95	2.95
4	61	IL-159	Lebanon Ave to S Belt E	IL	SB	PM	1.14	1.91	1.43	1.67	1.63
5	62	IL-159	I-270 to Governors Pkwy	IL	NB	PM	2.20	2.12	1.53	1.83	3.36
6	63	IL-159	Frank Scott Pkwy to I-64	IL	NB	PM	2.05	1.99	1.49	1.74	3.06
7	64	IL-203	Pontoon Rd to Madison Ave	IL	SB	PM	0.92	1.67	1.42	1.55	1.30
Total							9.6				

Figure 4a: Arterial Congested Locations (AM Peak)



Congested Locations Arterials - AM Peak

East-West Gateway Region
March 2022

Arterial Congestion

- Severe
- Heavy
- Moderate
- Uncongested

Other Map Data

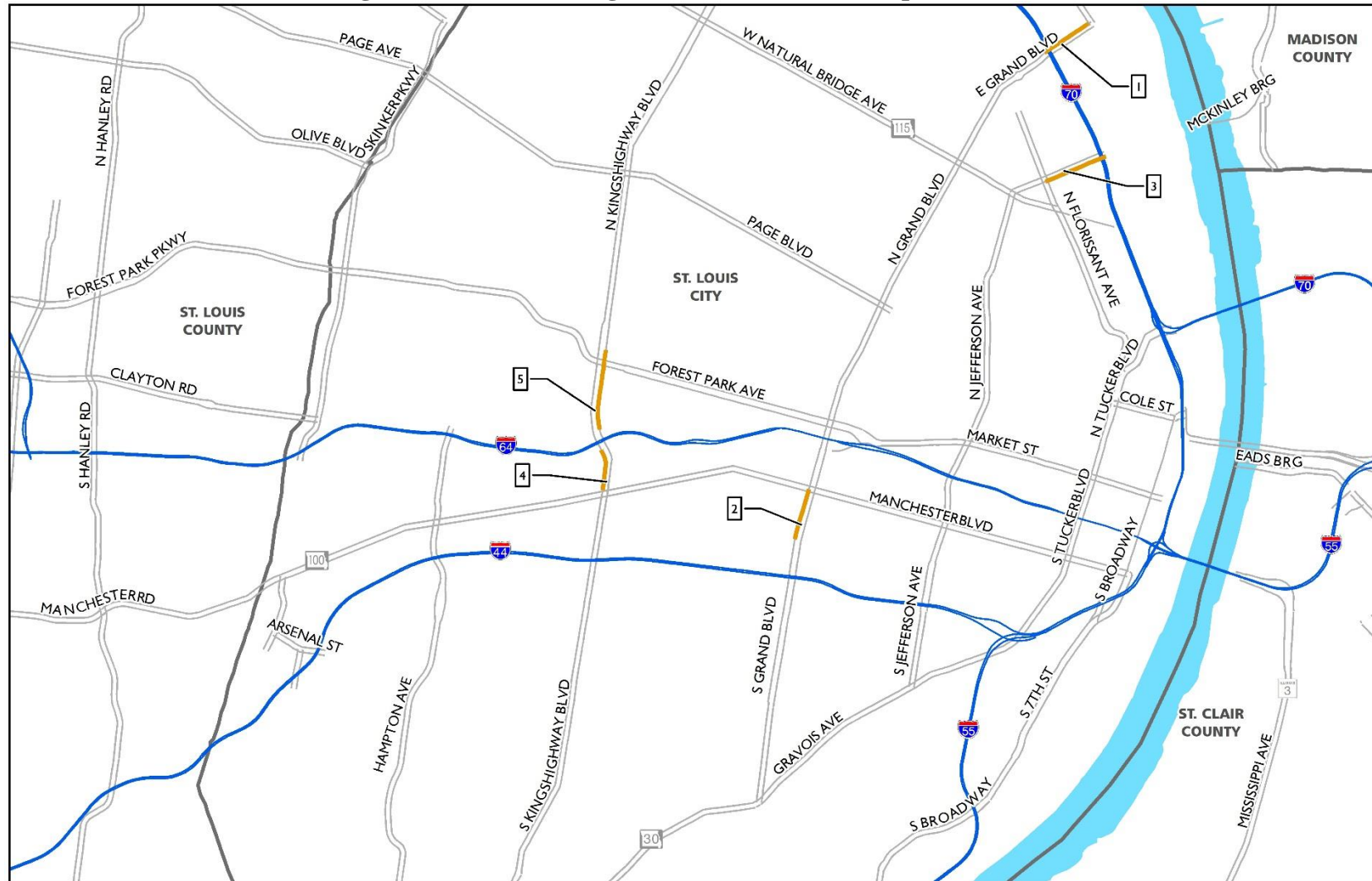
- Interstate / Freeway
- County Boundary
- River / Lake



Sources: Federal Highway Administration, Here Data;
East-West Gateway Council of Governments



Figure 4b: Arterial Congested Locations Inset Map (AM Peak)



Congested Locations Arterials - AM Peak Inset

East-West Gateway Region
March 2022

Arterial Congestion

- Severe
- Heavy
- Moderate
- Uncongested

Other Map Data

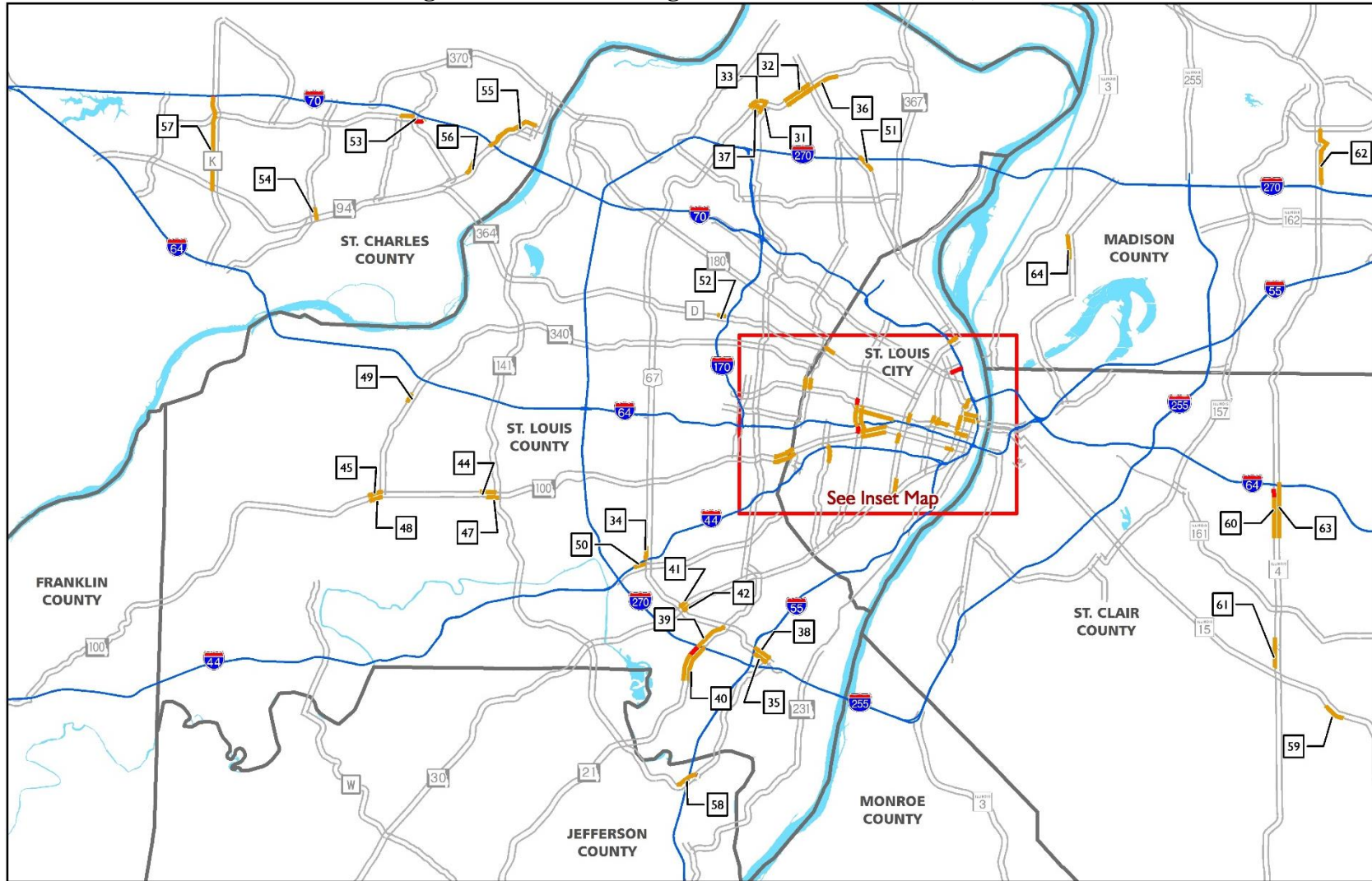
- Interstate / Freeway
- County Boundary
- River / Lake



Sources: Federal Highway Administration, Here Data;
East-West Gateway Council of Governments



Figure 5a: Arterial Congested Locations (PM Peak)



Congested Locations Arterials - PM Peak

East-West Gateway Region
March 2022

Arterial Congestion

- Severe
- Heavy
- Moderate
- Uncongested

Other Map Data

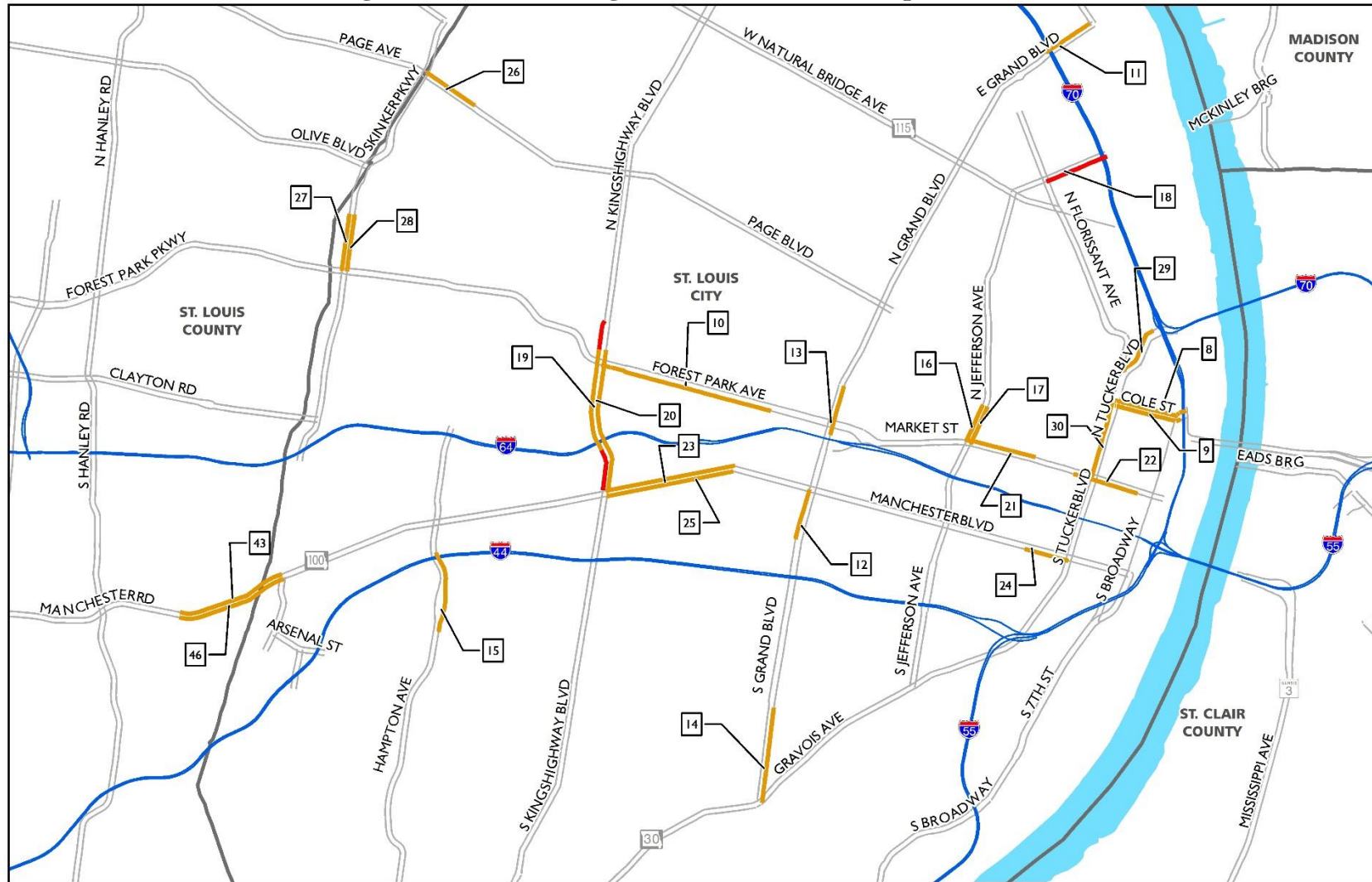
- Interstate / Freeway
- County Boundary
- River / Lake



Sources: Federal Highway Administration, Here Data;
East-West Gateway Council of Governments



Figure 5b: Arterial Congested Locations Inset Map (PM Peak)



Congested Locations Arterials - PM Peak Inset

East-West Gateway Region
March 2022

Arterial Congestion

- Severe
- Heavy
- Moderate
- Uncongested

Other Map Data

- Interstate / Freeway
- County Boundary
- River / Lake



Sources: Federal Highway Administration, Here Data;
East-West Gateway Council of Governments



1.3 Congestion Performance Analyses

Performance measures are key components of the CMP process as they:

- characterize existing and anticipated conditions on the regional transportation system;
- track progress toward meeting regional objectives;
- identify specific locations with congestion to address; and
- assess congestion mitigation strategies, programs, and projects.

In this section, three key analyses were undertaken for AM and PM peak periods. These are:

- Trends in congested miles (centerline length of congested locations) by peak-period;
- Trends in average PTI by peak-period;
- Trends in average TTI by peak-period;

1.3.1 Total Congestion Trend

Total Congestion Trend analysis focuses on overall changes in total congestion over time by peak period.

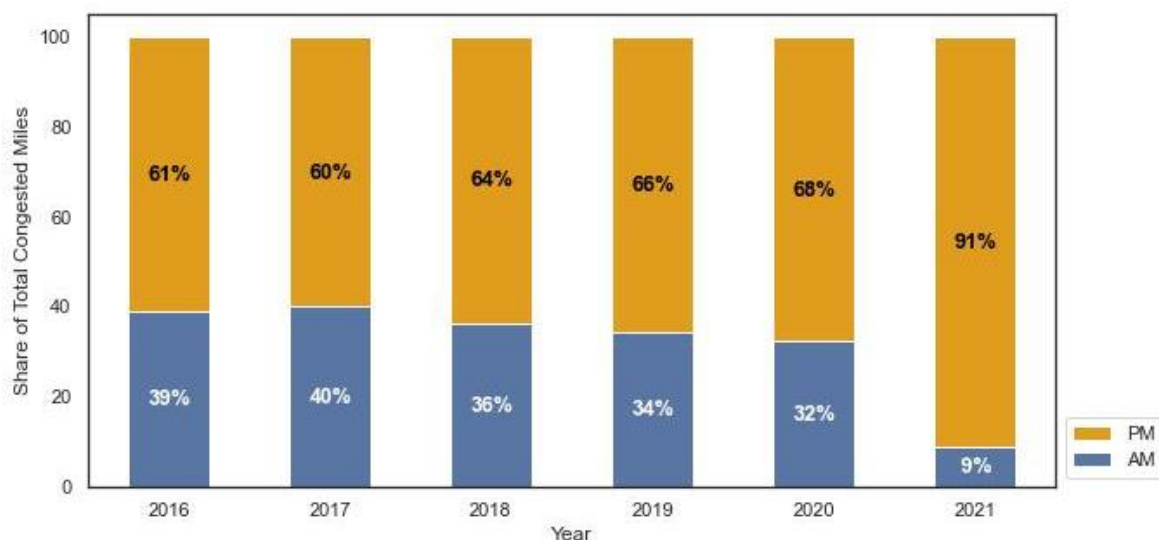
Freeways

Figure 6 compares the share of total freeway congested miles by peak period for each year.

Findings:

- The 2016-20 average share of PM peak period from total congested miles was about 64%. The share of PM peak period has continued to grow and reached 91% in 2021.

Figure 6: Trends in Total Congestion



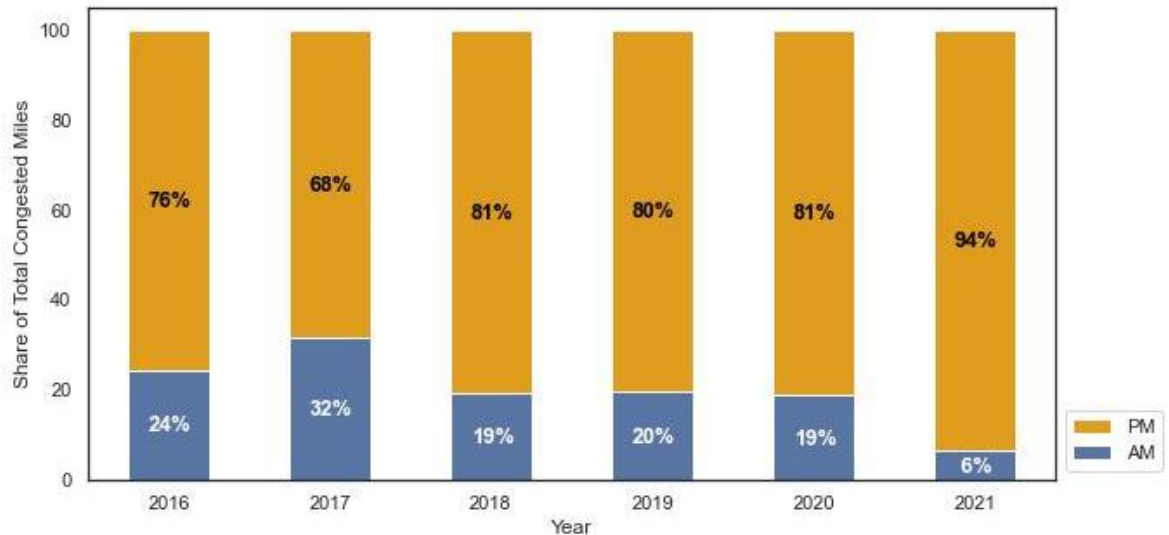
Arterials

Figure 7 compares the share of total arterial congested miles by peak period for each year.

Findings

- The share of total congested miles by peak period has been steady from 2018 to 2020. The share of PM peak period has increased significantly in 2021.

Figure 7: Trends in Total Congestion



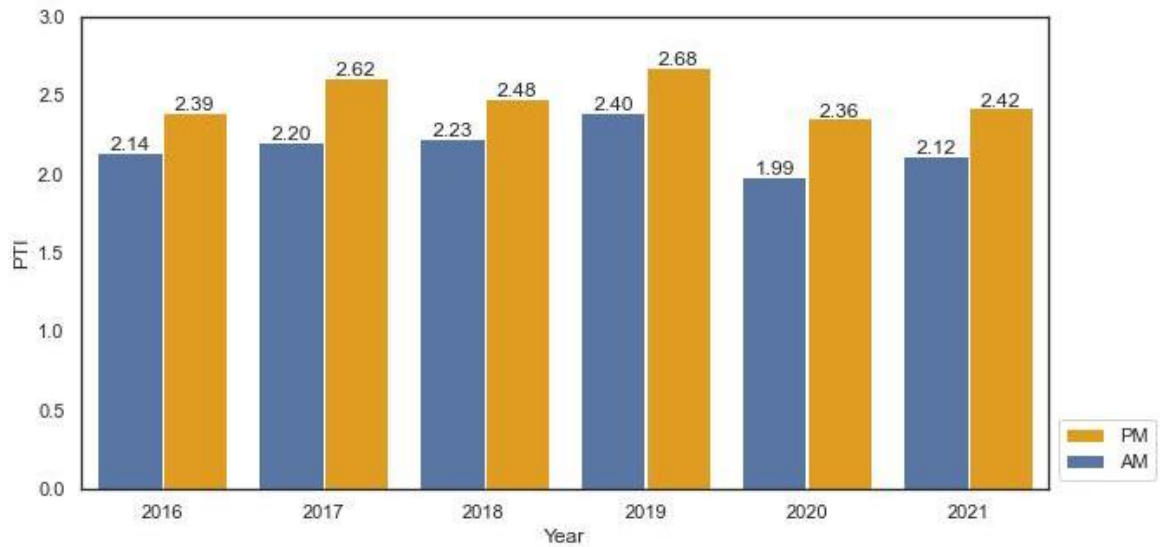
1.3.2 Planning Time Index Trend by Peak-Period

This section looks at changes in average PTI over time for each peak period.

Freeways

Figure 8 represents the change in average PTI for freeways. From 2016 to 2019, both AM and PM peak periods showed a slight upward trend, indicating a decrease of the reliability of travel times on the congested network. The average PTI in 2020 decreased significantly for both AM and PM periods. These values increased in 2021 compared to 2020 but are still lower than the 2019 values.

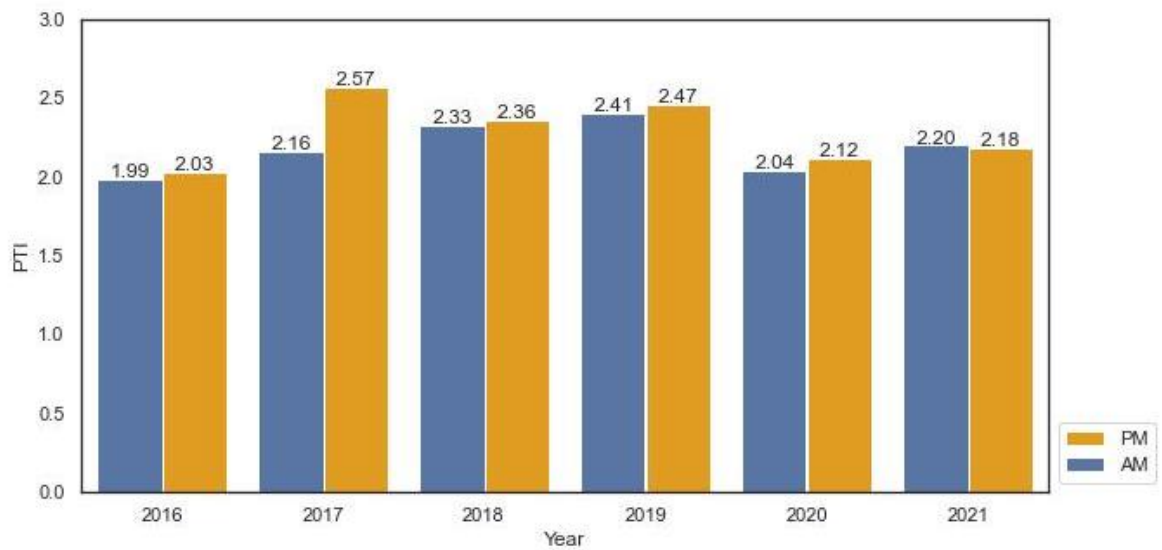
Figure 8: Trends in Planning Time Index (Average)



Arterials

Figure 9 represents the change in average PTI for Arterials. Both AM and PM peak hours showed a slight trend upwards from 2016 to 2019. The average PTI has decreased significantly in 2020 but shows an increase in 2021. The average values for 2021 are still significantly lower than those of 2019.

Figure 9: Trends in Planning Time Index (Average)

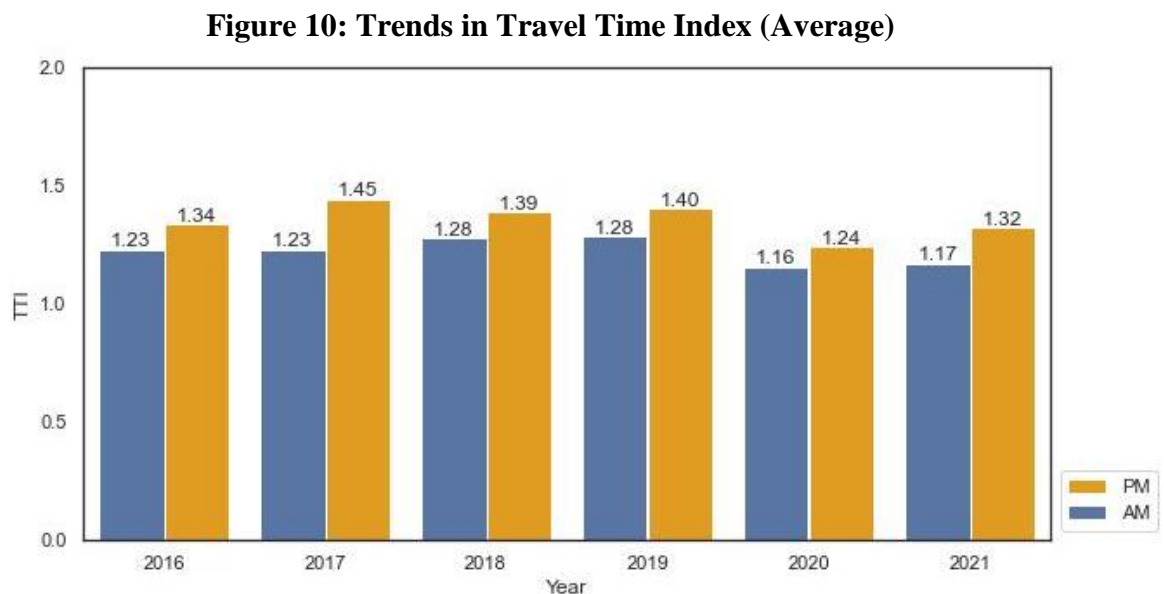


1.3.3 Travel Time Index Trend by Peak-Period

This analysis tracks changes in average TTI over time for each peak period

Freeways

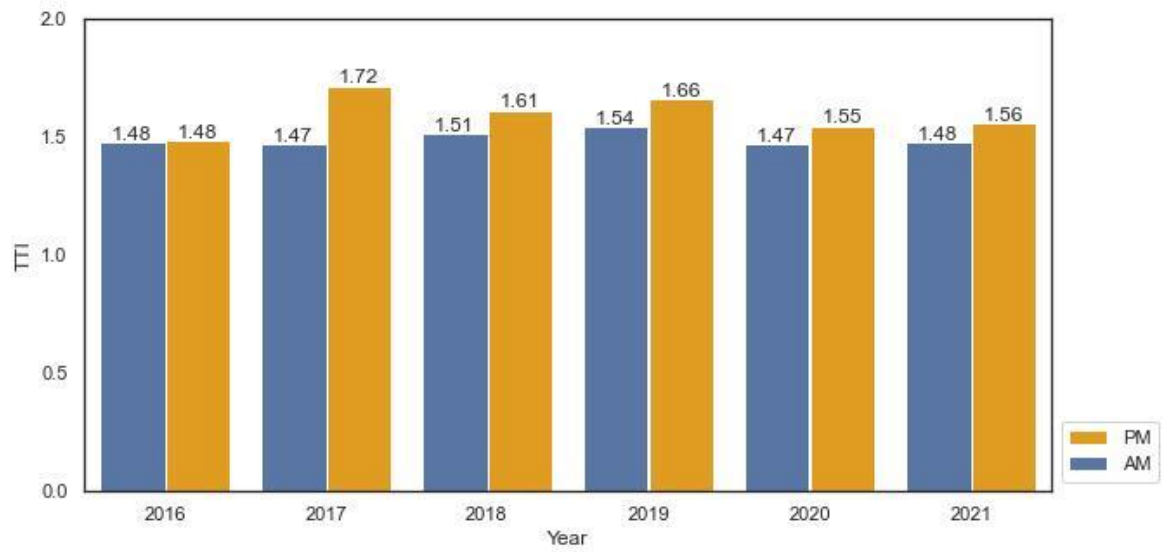
Figure 10 compares average TTI for morning and evening peak periods. Overall, both AM and PM peaks showed a slight upward trend in travel times from 2016 to 2019. The average TTI decreased significantly in 2020. In 2021, the average TTI for AM period remains similar to that of 2020 but the value for PM period sees an increase,



Arterials

Figure 11 compares average TTI for morning and evening peak periods. Similar to other measures, TTI has decreased in 2020. The 2021 values of average TTI, in both AM and PM peak periods, remain similar to those of 2020.

Figure 11: Trends in Travel Time Index (Average)



1.4 Ranked Congested Locations

The top 10 freeway congested locations by severity and delay impact are shown in tables 9 and 10, respectively. Tables 11 and 12, represent the same information for arterials.

The complete list of ranked congested locations are available in the Appendix 1 and 2.

Freeways

Table 9: Top 10 Locations by Severity

No	Route	Limits	State	County	Direction	Peak	Queue Length	PTI	TTI	Severity	Delay Impact
1	I-64	Ewing Ave to Poplar St Bridge	MO	St Louis City	EB	PM	2.07	9.29	3.05	6.17	6.33
2	I-55	Lafayette Ave to 7th St	MO	St Louis City	NB	PM	0.44	3.93	1.59	2.76	0.69
3	I-64	Winghaven Blvd to I-70	MO	St Charles	WB	PM	5.59	3.47	1.59	2.53	8.89
4	I-170	Delmar Blvd to Clayton Rd	MO	St Louis	SB	PM	1.67	2.98	1.37	2.18	2.29
5	I-64	S Boyle Ave to Big Bend Blvd	MO	St Louis City/County	WB	PM	3.94	2.73	1.56	2.15	6.14
6	I-270	MO-367 to Washington St	MO	St Louis	WB	AM	3.69	2.79	1.23	2.01	4.53
7	I-44	I-64 to I-70	MO	St Louis City	EB	PM	1.84	2.65	1.26	1.96	2.31
8	I-70	Lake St Louis Blvd to Wentzville Pkwy	MO	St Charles	WB	PM	5.70	2.48	1.37	1.93	7.81
9	I-64	McKnight Rd to Boland Pl	MO	St Louis	EB	PM	1.71	2.48	1.19	1.84	2.03
10	I-270	James S McDonnell Blvd to Washington St	MO	St Louis	EB	PM	4.48	2.33	1.33	1.83	5.95

Table 10: Top 10 Locations by Delay Impact

No	Route	Limits	State	County	Direction	Peak	Queue Length	PTI	TTI	Severity	Delay Impact
1	I-64	Winghaven Blvd to I-70	MO	St Charles	WB	PM	5.59	3.47	1.59	2.53	8.89
2	I-70	Lake St Louis Blvd to Wentzville Pkwy	MO	St Charles	WB	PM	5.70	2.48	1.37	1.93	7.81
3	I-64	Ewing Ave to Poplar St Bridge	MO	St Louis City	EB	PM	2.07	9.29	3.05	6.17	6.33
4	I-64	S Boyle Ave to Big Bend Blvd	MO	St Louis City/County	WB	PM	3.94	2.73	1.56	2.15	6.14
5	I-270	James S McDonnell Blvd to Washington St	MO	St Louis	EB	PM	4.48	2.33	1.33	1.83	5.95
6	I-270	MO-367 to Washington St	MO	St Louis	WB	AM	3.69	2.79	1.23	2.01	4.53
7	I-270	I-64 to Dougherty Ferry Rd	MO	St Louis	SB	PM	3.81	2.10	1.16	1.63	4.42
8	I-270	IL-159 to I-55	IL	IL	EB	PM	3.04	2.00	1.25	1.63	3.80
9	I-270	Page Ave to Ladue Rd	MO	St Louis	SB	PM	2.86	1.99	1.23	1.61	3.52
10	I-64	Poplar St Bridge to I-55/64/70 E Split	IL	IL	EB	PM	2.49	1.47	1.19	1.33	2.96

Arterials

Table 11: Top 10 Locations by Severity

No	Route	Limits	State	County	Direction	Peak	Queue Length	PTI	TTI	Severity	Delay Impact
1	Salisbury St	Florissant Ave to I-70	MO	St Louis City	EB	PM	0.49	3.29	2.01	2.65	0.98
2	MO-AC	Old Halls Ferry Rd to Dunn Rd	MO	St Louis	NB	PM	0.69	3.43	1.74	2.59	1.20
3	Skinker Blvd	Delmar Blvd to Forest Park Pkwy	MO	St Louis City	SB	PM	0.43	3.13	1.85	2.49	0.79
4	US-67	St Ferdinand St to Washington St	MO	St Louis	SB	PM	0.67	3.20	1.77	2.49	1.19
5	Grand Blvd	Chouteau Ave to Park Ave	MO	St Louis City	SB	PM	0.38	3.29	1.62	2.46	0.62
6	MO-340	Chesterfield Pkwy to Baxter Rd	MO	St Louis	SB	PM	0.38	2.69	1.81	2.25	0.69
7	MO-100	MO-141 to Baxter Rd	MO	St Louis	WB	PM	0.60	2.69	1.67	2.18	1.01
8	Kingshighway Blvd	Lindell Blvd to MO-100	MO	St Louis City	SB	PM	1.28	2.57	1.67	2.12	2.14
9	Grand Blvd	Hall St to I-70	MO	St Louis City	SB	PM	0.39	2.22	1.84	2.03	2.35
10	Market St	14th St to 7th St	MO	St Louis City	EB	PM	0.50	2.46	1.59	2.03	0.79

Table 12: Top 10 Locations by Delay Impact

No	Route	Limits	State	County	Direction	Peak	Queue Length	PTI	TTI	Severity	Delay Impact
1	MO-K	I-70 to MO-364	MO	St Charles	SB	PM	3.50	1.89	1.49	1.69	5.22
2	MO-21	Lindbergh Blvd to Butler Hill Rd	MO	St Louis	SB	PM	2.61	2.19	1.60	1.90	4.18
3	US-67	New Florissant Rd to Old Halls Ferry Rd	MO	St Louis	NB	PM	2.19	1.97	1.56	1.77	3.41
4	IL-159	I-270 to Governors Pkwy	IL	IL	NB	PM	2.20	2.12	1.53	1.83	3.36
5	IL-159	Frank Scott Pkwy to I-64	IL	IL	NB	PM	2.05	1.99	1.49	1.74	3.06
6	IL-159	I-64 to Frank Scott Pkwy	IL	IL	SB	PM	1.80	2.25	1.64	1.95	2.95
7	MO-94	5th St to I-70	MO	St Charles	SB	PM	1.99	1.79	1.45	1.62	2.88
8	Grand Blvd	Hall St to I-70	MO	St Louis City	SB	PM	0.39	2.22	1.84	2.03	3.66
9	MO-21	Butler Hill rd to I-270	MO	St Louis	NB	PM	1.50	2.01	1.57	1.79	2.35
10	Kingshighway Blvd	Lindell Blvd to MO-100	MO	St Louis City	SB	PM	1.28	2.57	1.67	2.12	2.14

1.5 Changes in Overall Severity and Delay Impact

In this section, we provide a high-level comparison of severity and delay impacts on the regional network from 2016 to 2021 based on the data developed in the Annual Regional Congestion reports. The figures in this section show ranking of congested locations based on their severity and delay impact scores.

Freeways

Overall, the severity of congestion increased over time (Figure 12). In 2019, the highest levels of congestion dropped below 2018 levels. The congested locations in 2020 had the lowest severity in the six-year period. The highest level of severity occurs in 2021 and pertains to an eastbound section of I-64, from Ewing Ave to Poplar St Bridge.

The highest levels of delay impact decreased slightly over years (Figure 13). 2016 and 2017 had the highest delay impacts, followed by gradual decreases in 2018 and 2019. While for the most part (except 2017), the ranking of congested locations exhibited no significant pattern of increase or decrease, the delay impact decreased significantly in 2020 and remains the same in 2021.

Arterials

Figure 14 and 15 show rankings of congested locations by severity and delay impact.

The severity of congestion has seen a steady increase from 2016 to 2019. In 2020 however, the severity has dropped significantly, but it is still above 2016 levels. The 2021 ranking of locations by severity is quite similar to that of 2020.

In general, the delay impact has increased from 2016 to 2019. The delay impact in 2021 is the lowest among all studied years. The 2021 ranking of locations is fairly similar to that of 2020 with a slight decrease in the level of delay impact.

Figure 12: Ranking of Congested Freeway Locations by Severity

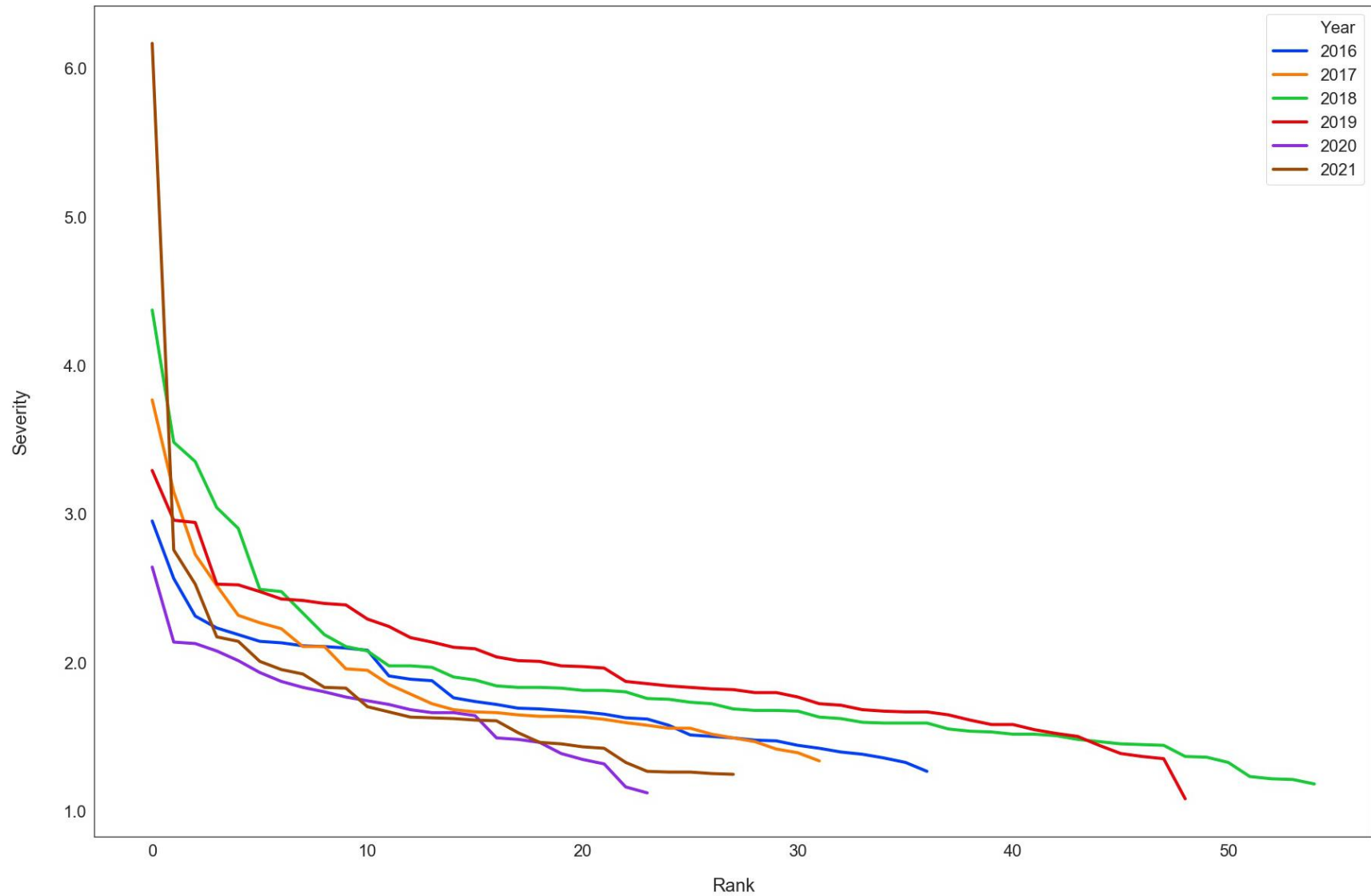


Figure 13: Ranking of Congested Freeway Locations by Delay Impact

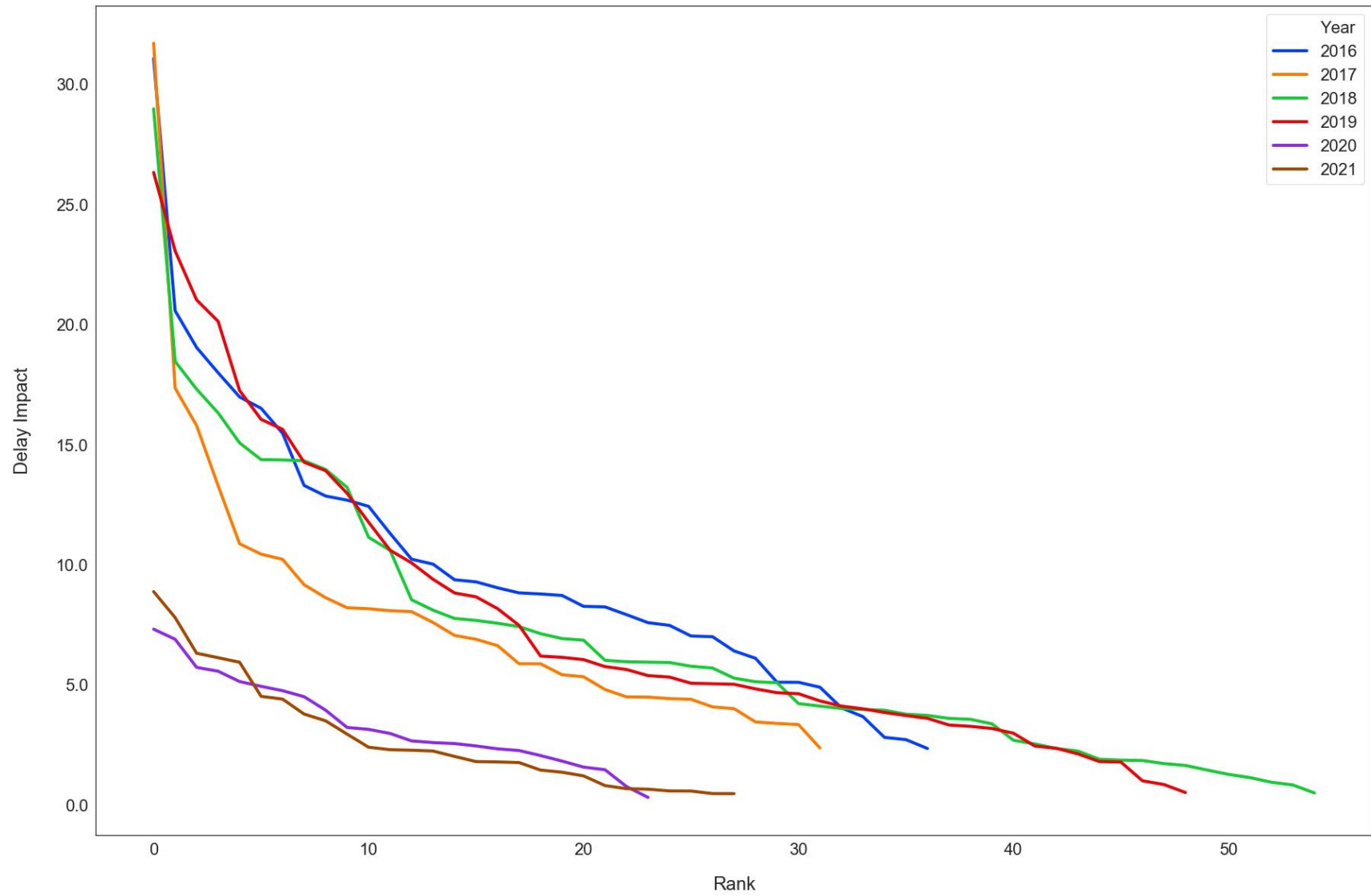


Figure 14: Ranking of Congested Arterial Locations by Severity

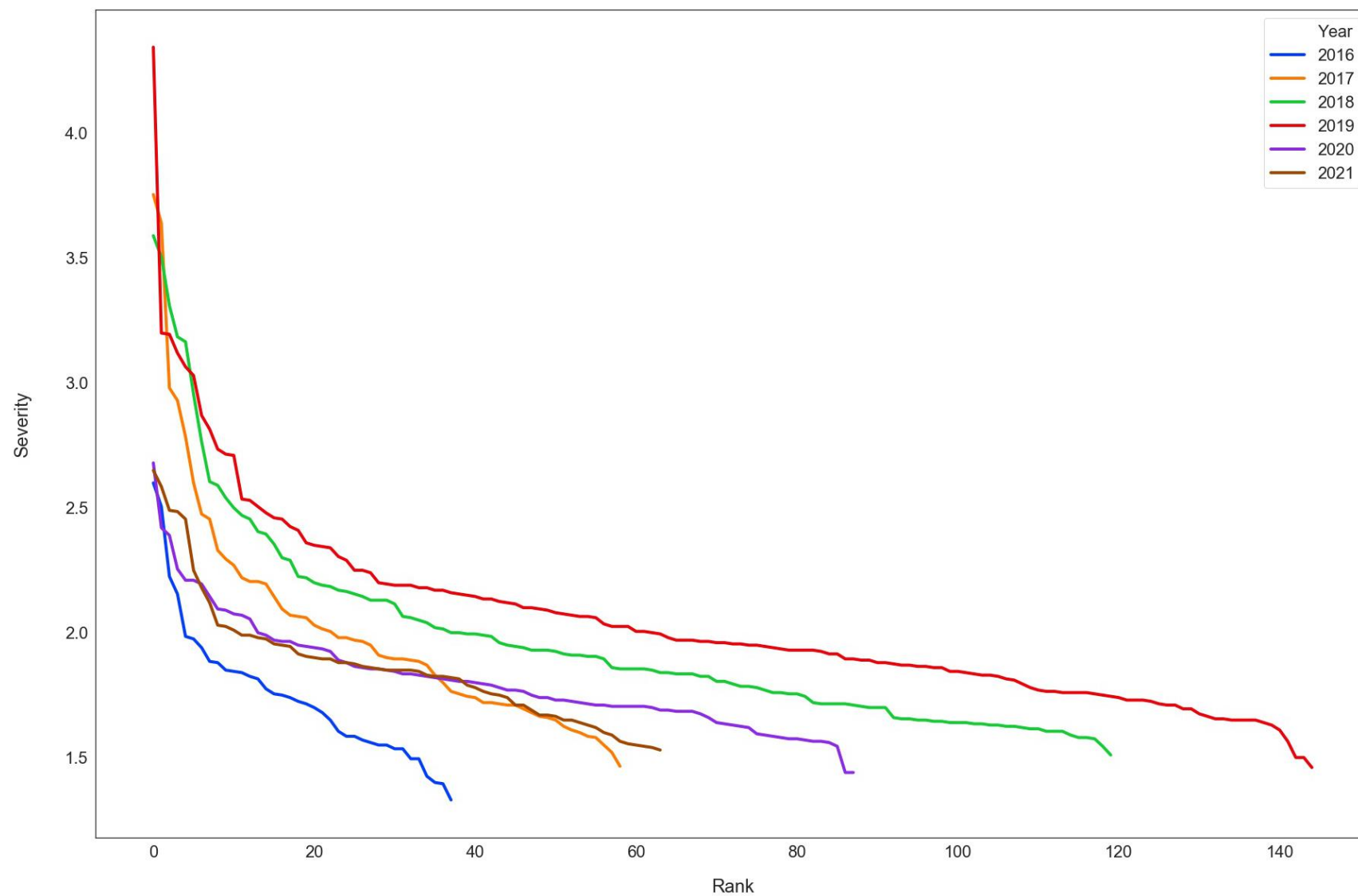
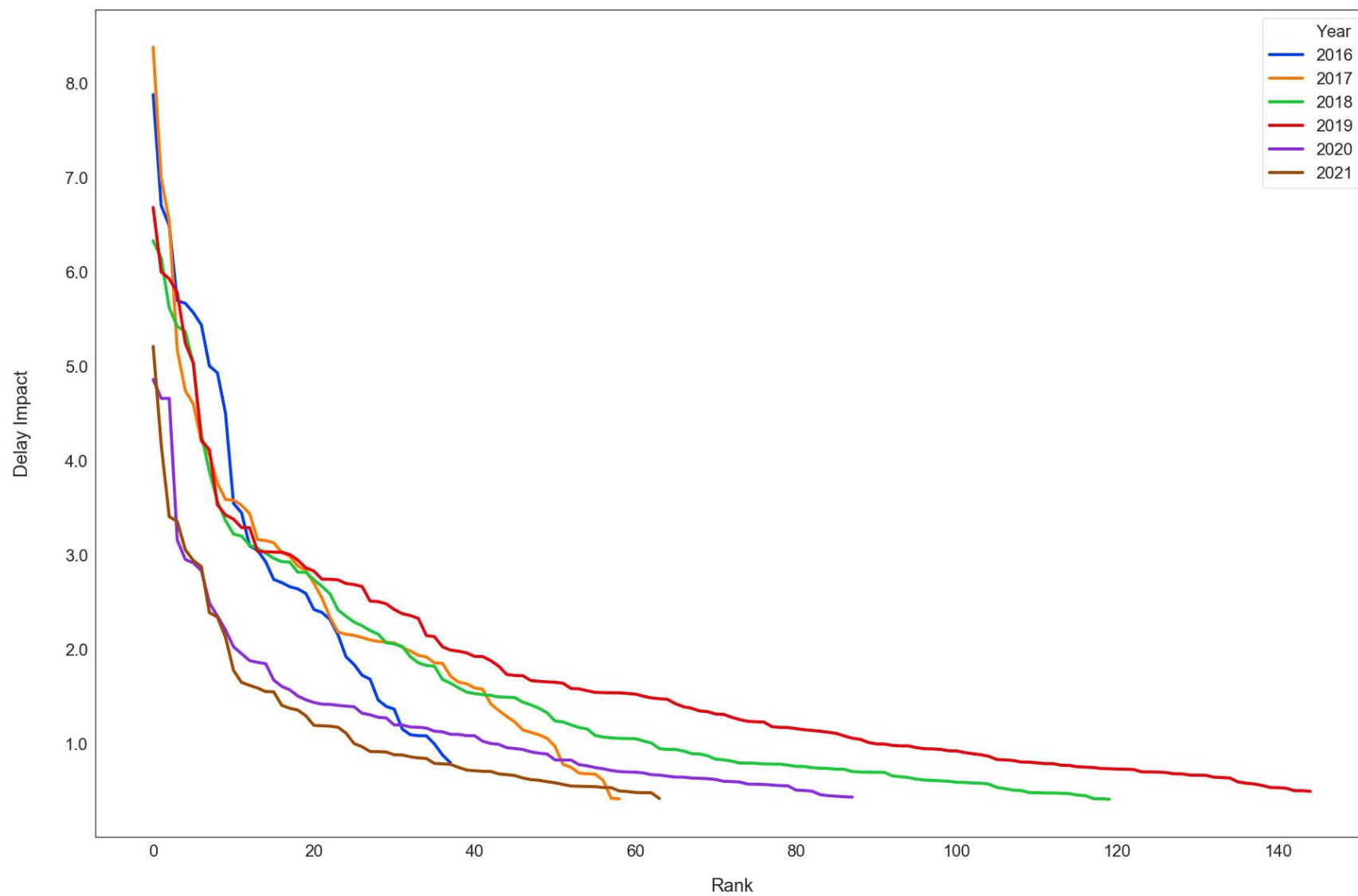


Figure 15: Ranking of Congested Arterial Locations by Delay Impact



2 The Impact of Covid-19

Like other metropolitan areas, Covid-19 impacted St. Louis Region in different ways. Stay-at-home orders and the implementation of work-from-home decreased traffic and changed the patterns of movements. A proper study of how Covid-19 impacted mobility and congestion requires detailed data analysis.

In this section, we use a simple approach to obtain a general picture of how Covid-19 impacted congestion in St. Louis Region. To do so, we first compare the basic measures of congestion between 2019, 2020, and 2021 and assume that the difference is mainly due to the impact of pandemic. We then measure congestion progression.

2.1 Basic Measures of Congestion

This section provides a series of charts that compare the average PTI and TTI for all congested locations and total congested miles over studied years. The Severity and Delay Impact charts were developed using the average of the ten congested locations with the highest severity and delay impact numbers in each case. This provides a valid representation of the region-wide impact of Covid-19 on congestion.

The following figures show that all measures of congestion, for freeways and arterials, decreased significantly from 2019 to 2020. Most of the congestion measures see an increase in 2021 but their value, are still significantly lower than those of 2019.

A major finding from this analysis is that for the AM peak period, total congested miles in both freeways and arterials decreased significantly in 2021 compared to 2020.

Additionally, figures 18 through 23 provide an overview of congested freeway locations in AM and PM peak periods from 2019 to 2021 and indicate significant changes in congestion patterns within the three year period.

Figure 16: Change in Congestion Measure for Freeways:

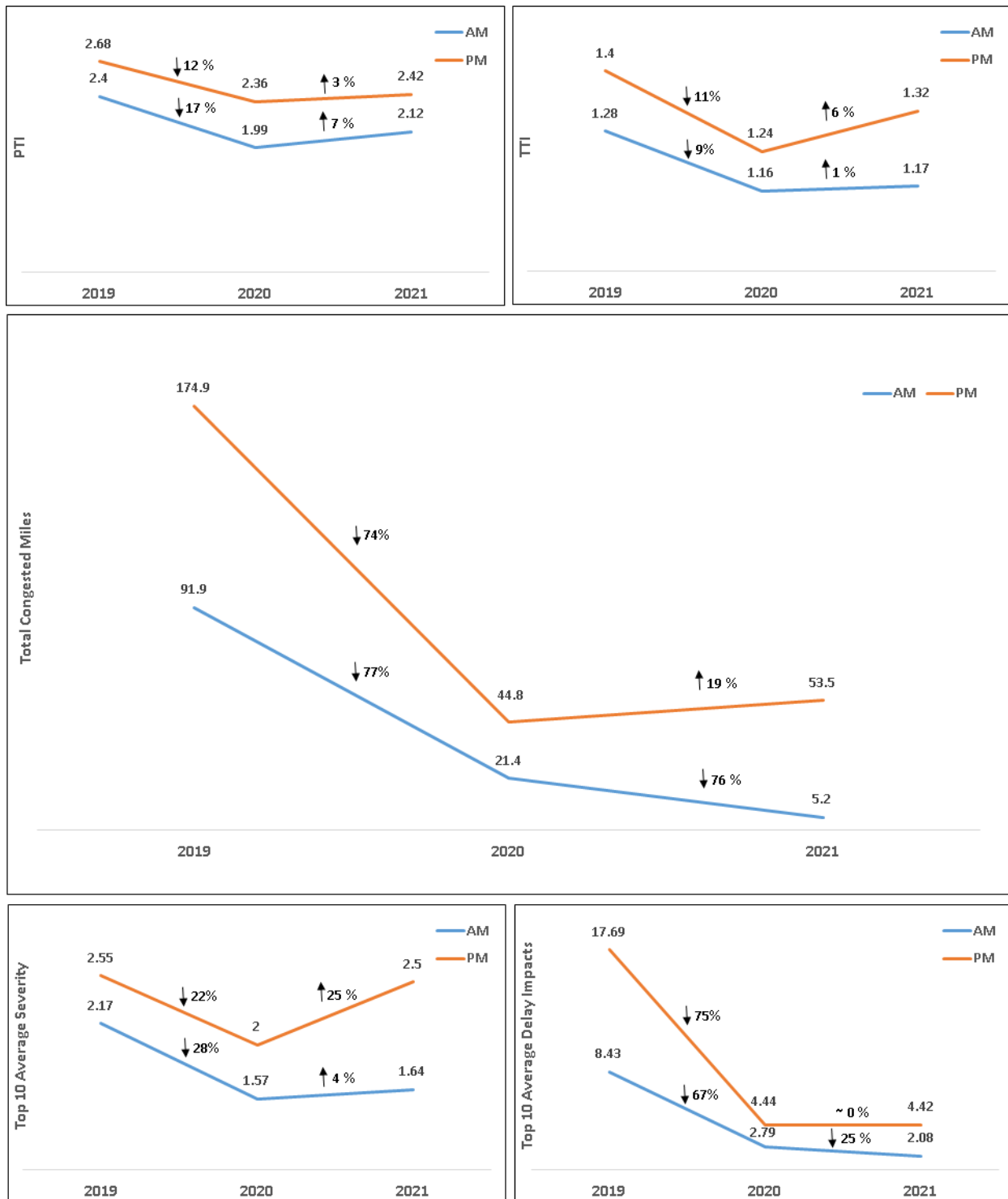


Figure 17: Change in Congestion Measure for Arterials:

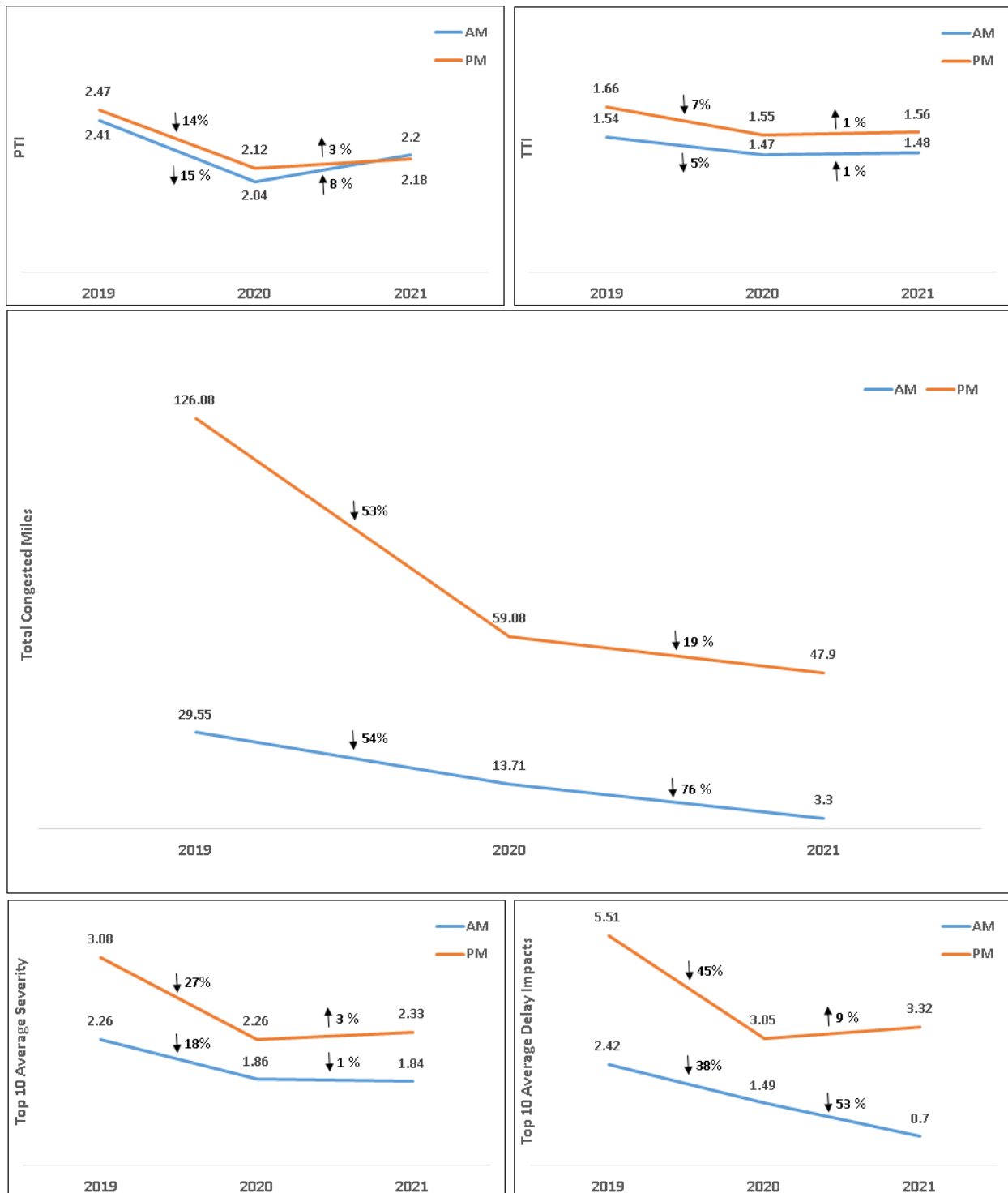
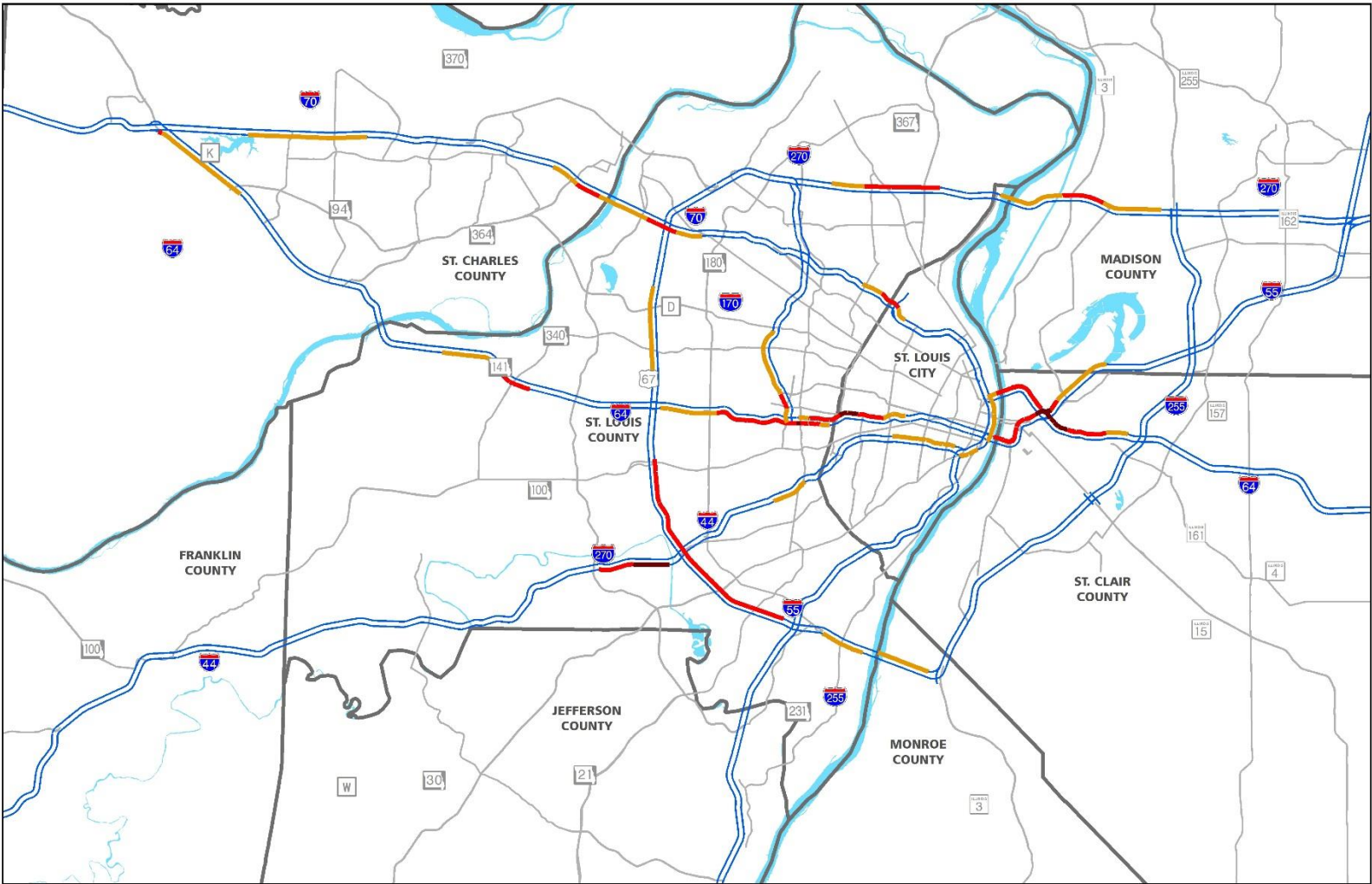


Figure 18: Congested Freeway Locations in 2019 (AM Peak)



Congested Locations

Freeways - AM Peak

East-West Gateway Region
May 2020

Freeway Congestion

- Severe
- Heavy
- Moderate
- Uncongested

Other Map Data

- Major Arterial
- County Boundary
- River / Lake

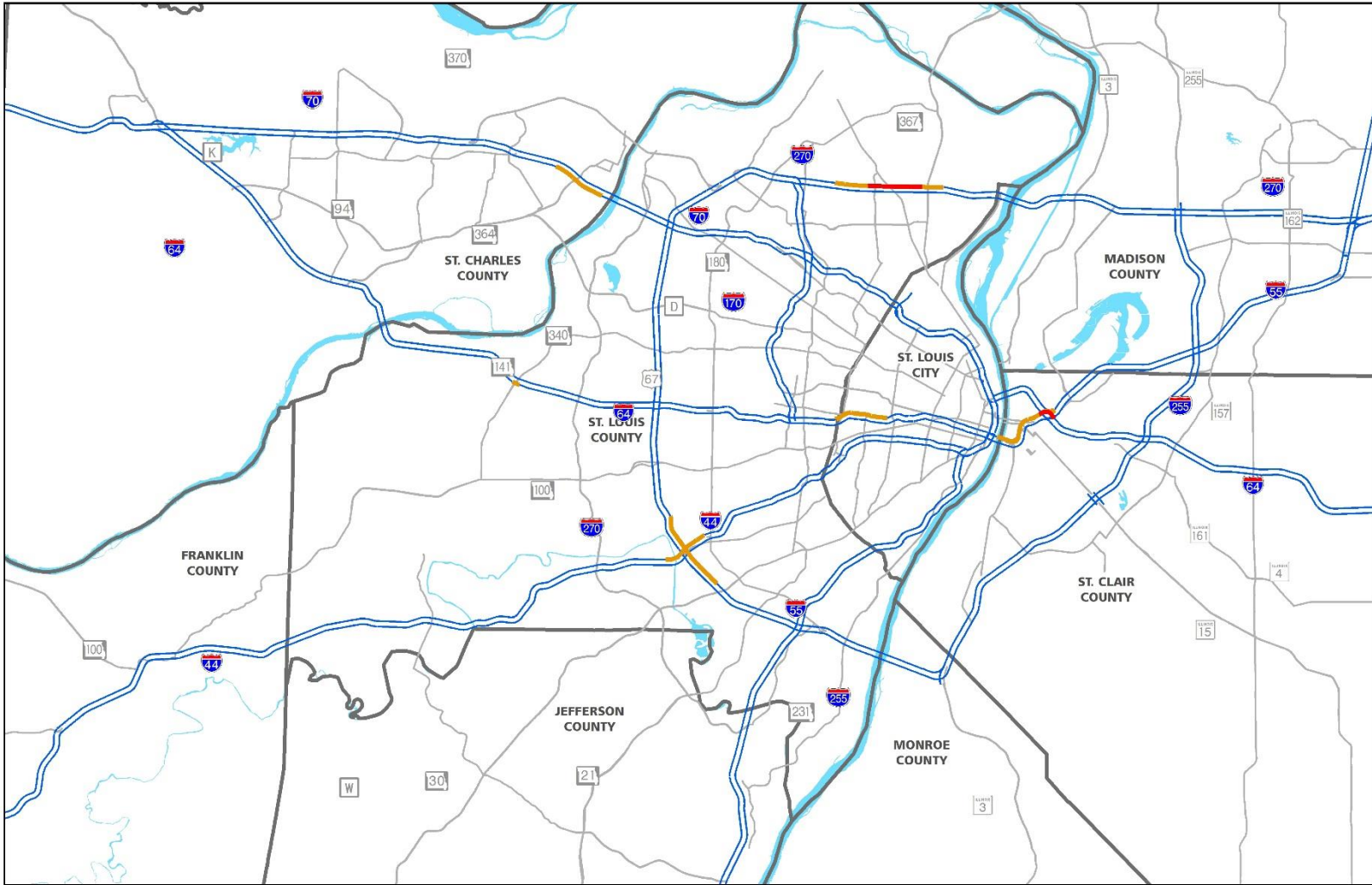


Sources: Federal Highway Administration, Here Data;
East-West Gateway Council of Governments



EAST-WEST GATEWAY
Council of Governments

Figure 19: Congested Freeway Locations in 2020 (AM Peak)



Congested Locations

Freeways - AM Peak

East-West Gateway Region
May 2021

Freeway Congestion

- Severe
- Heavy
- Moderate
- Uncongested

Other Map Data

- Major Arterial
- County Boundary
- River / Lake

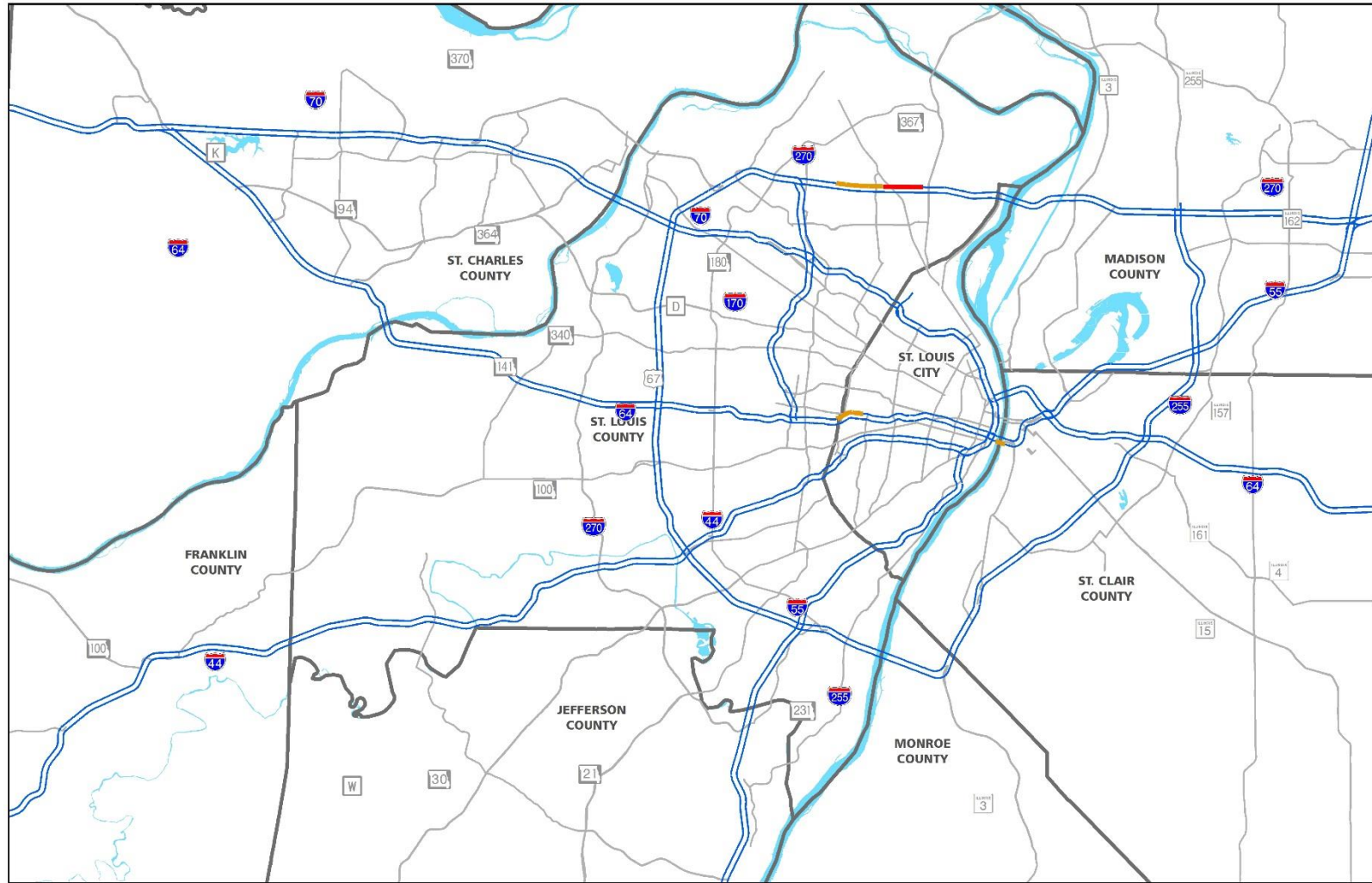


Sources: Federal Highway Administration, Here Data;
East-West Gateway Council of Governments



EAST-WEST GATEWAY
Council of Governments

Figure 20: Congested Freeway Locations in 2021 (AM Peak)



Congested Locations Freeways - AM Peak

East-West Gateway Region
March 2022

Freeway Congestion

- Severe
- Heavy
- Moderate
- Uncongested

Other Map Data

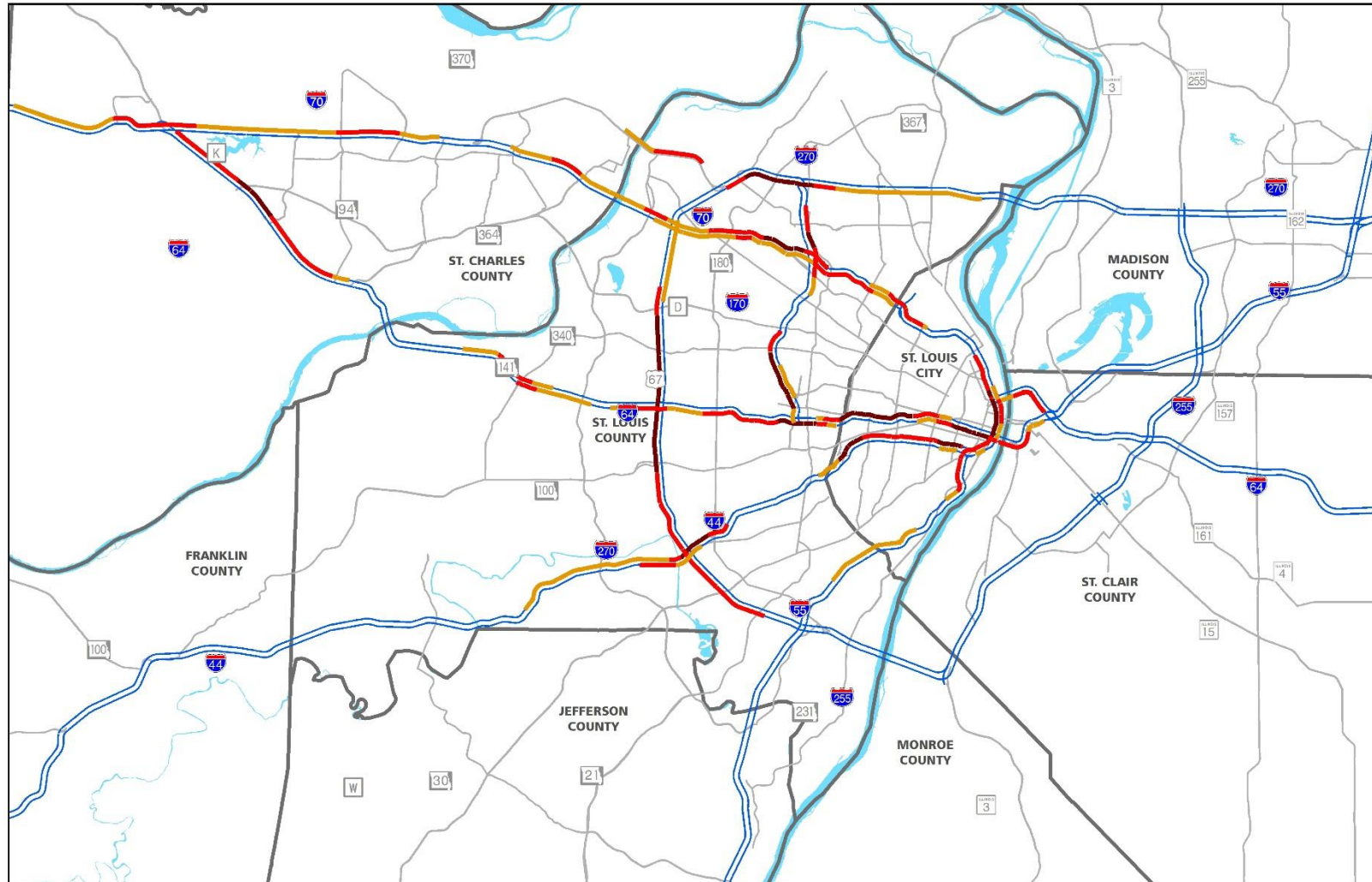
- Major Arterial
- County Boundary
- River / Lake



Sources: Federal Highway Administration, Here Data;
East-West Gateway Council of Governments



Figure 21: Congested Freeway Locations in 2019 (PM Peak)



Congested Locations Freeways - PM Peak

East-West Gateway Region
May 2020

Freeway Congestion

- Severe
- Heavy
- Moderate
- Uncongested

Other Map Data

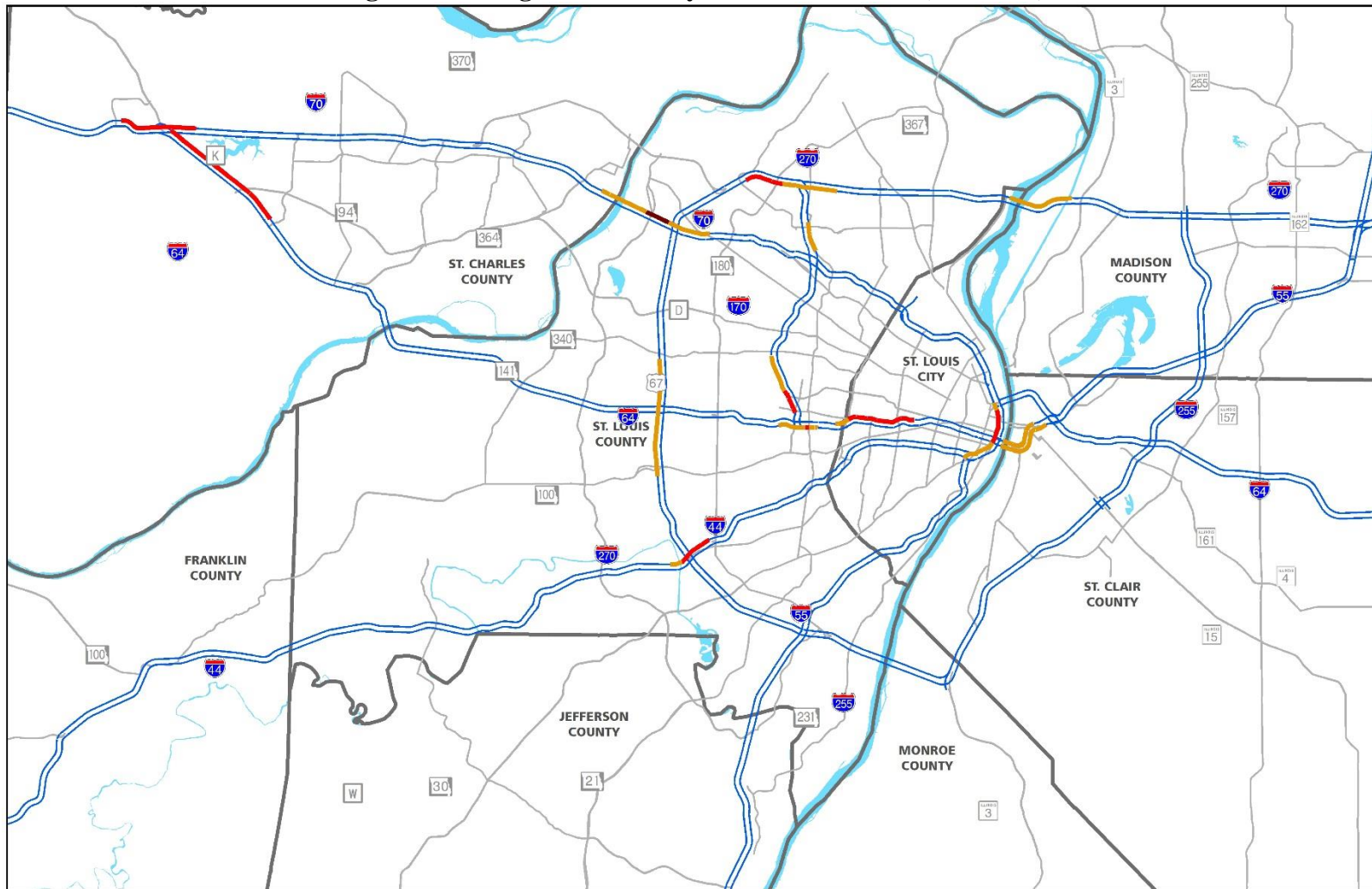
- Major Arterial
- County Boundary
- River / Lake



Sources: Federal Highway Administration, Here Data;
East-West Gateway Council of Governments



Figure 22: Congested Freeway Locations in 2020 (PM Peak)



Congested Locations

Freeways - PM Peak

East-West Gateway Region
May 2021

Freeway Congestion

- Severe
- Heavy
- Moderate
- Uncongested

Other Map Data

- Major Arterial
- County Boundary
- River / Lake

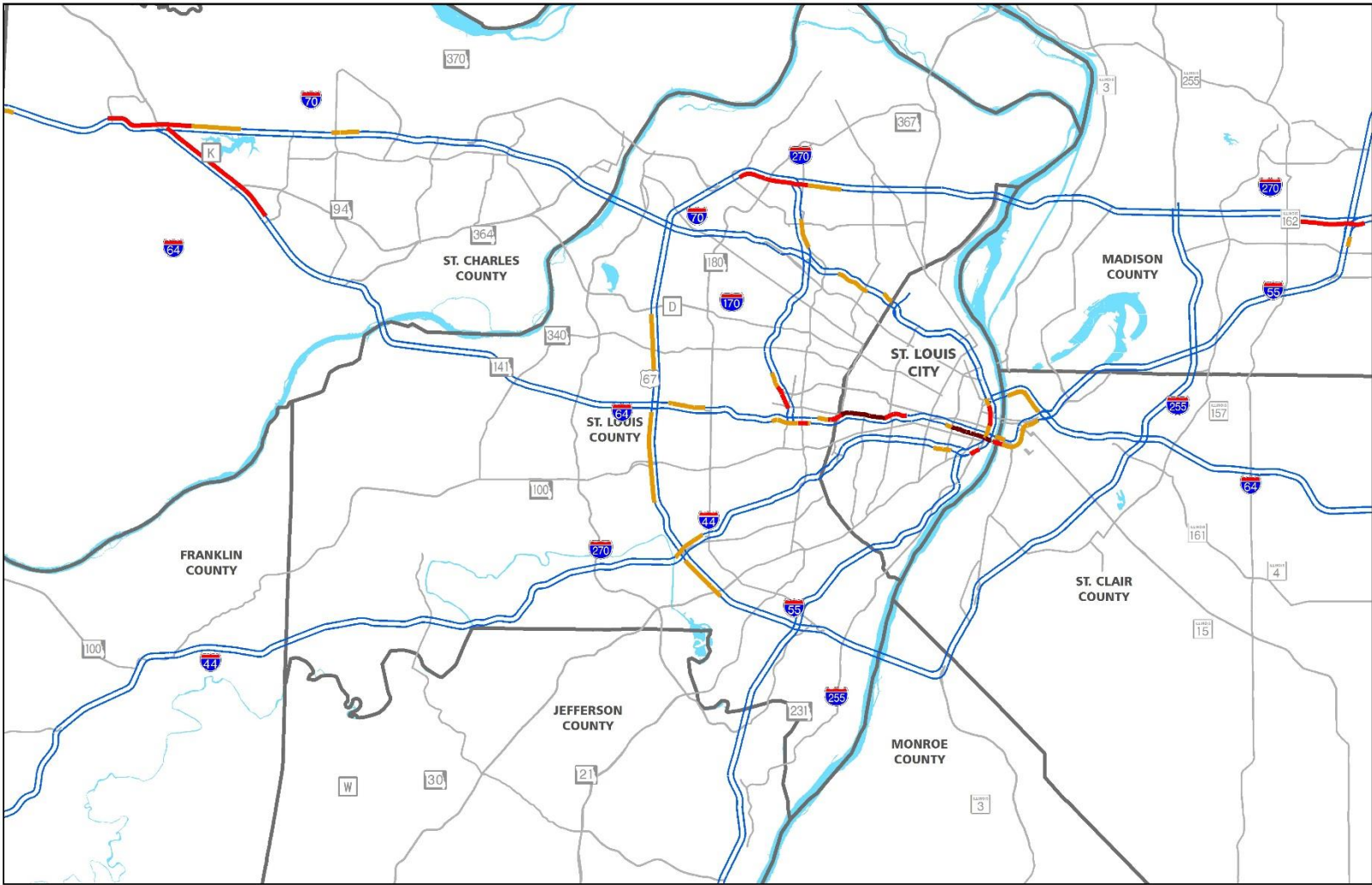


Sources: Federal Highway Administration, Here Data;
East-West Gateway Council of Governments



EAST-WEST GATEWAY
Council of Governments

Figure 23: Congested Freeway Locations in 2021 (PM Peak)



Congested Locations

Freeways - PM Peak

East-West Gateway Region
March 2022

Freeway Congestion

- Severe
- Heavy
- Moderate
- Uncongested

Other Map Data

- Major Arterial
- County Boundary
- River / Lake



Sources: Federal Highway Administration, Here Data;
East-West Gateway Council of Governments



EAST-WEST GATEWAY
Council of Governments

2.2 Congestion Progression

This section provides a series of figures that represent the progression of congested segments of the regional freeway network over space and time. Each figure represents congested locations for the average of a single hour during the morning peak and evening peak period. The congested locations are also represented for the after-peak hour of 6 -7 PM.

The figures suggest that the number of congested locations in the AM hours is higher in 2020 compared to 2021. In the PM hours however, the number and severity of congested locations is significantly higher in 2021. These suggestions are consistent with findings in section 1.3.1; that the ratio of PM to AM congested locations is significantly higher in 2021 compared to previous years.

Additionally, these figures can help identify where the bottlenecks begin and compare their progression during the peak hour.

The figures also suggest total congested miles are higher in the PM peak period, a finding also supported in the previous sections.

Figure 24: Regional Freeway Congestion (6-7 AM)

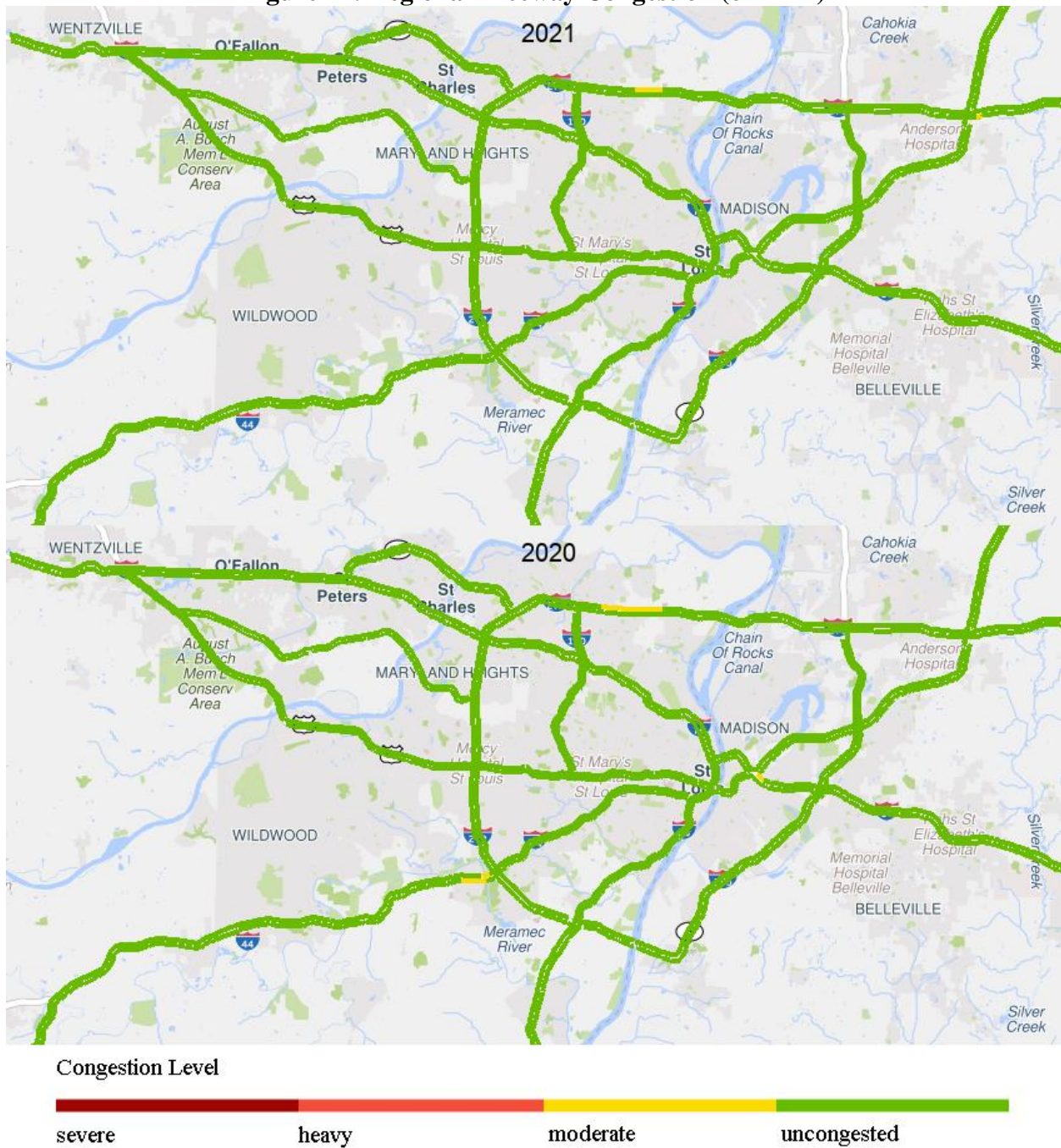


Figure 25: Regional Freeway Congestion (7-8 AM)

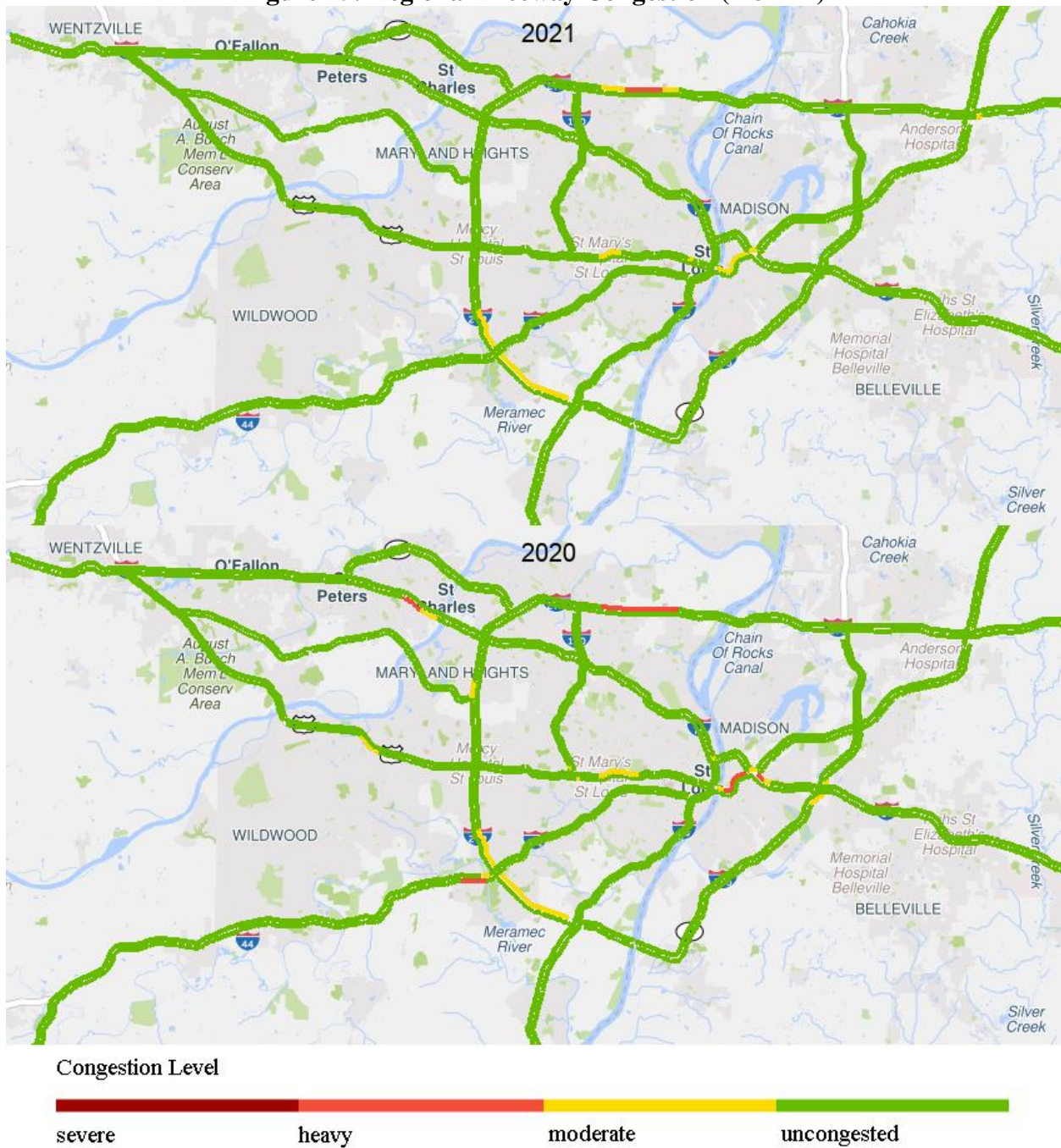


Figure 26: Regional Freeway Congestion (8-9 AM)

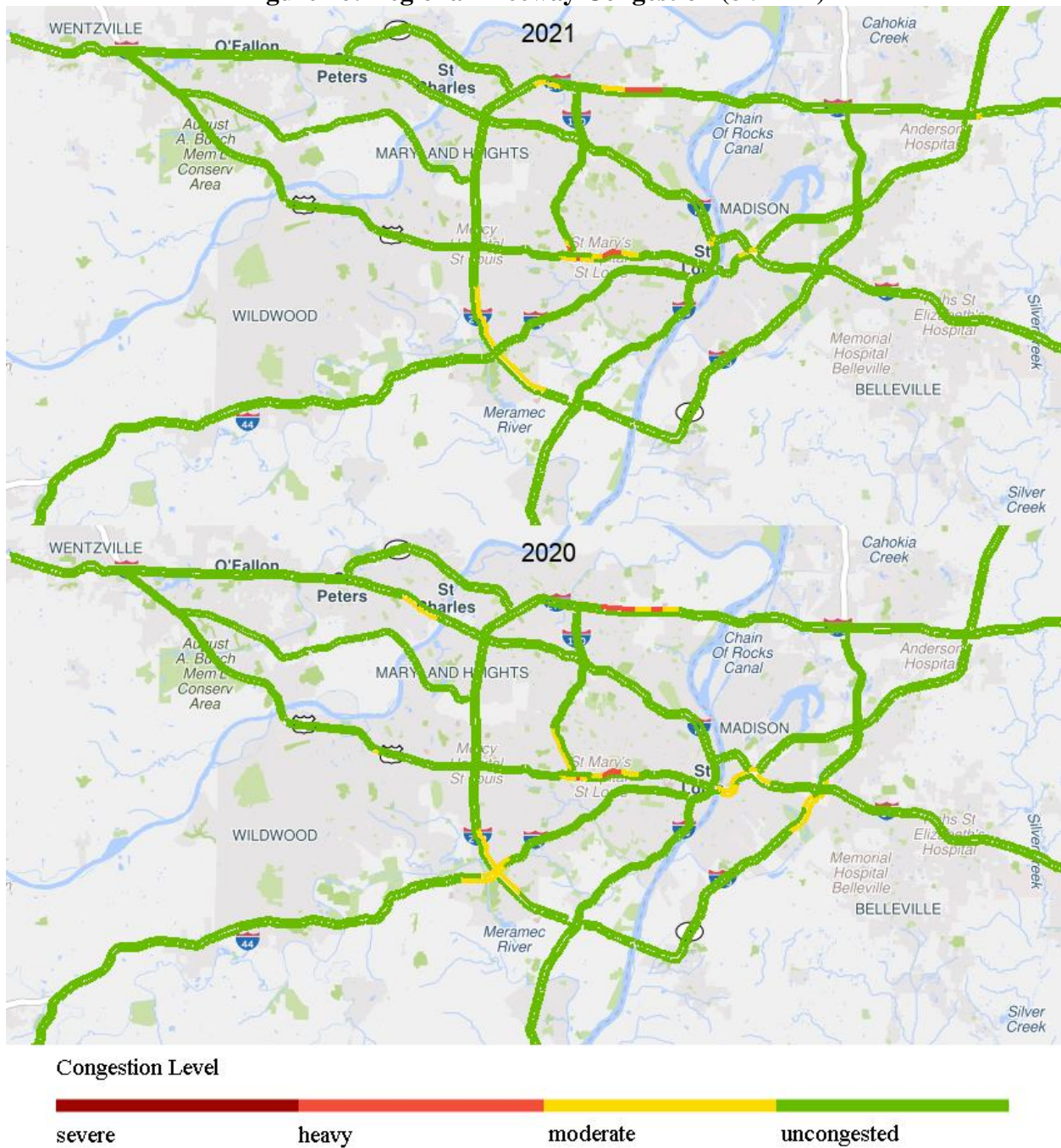


Figure 27: Regional Freeway Congestion (3-4 PM)

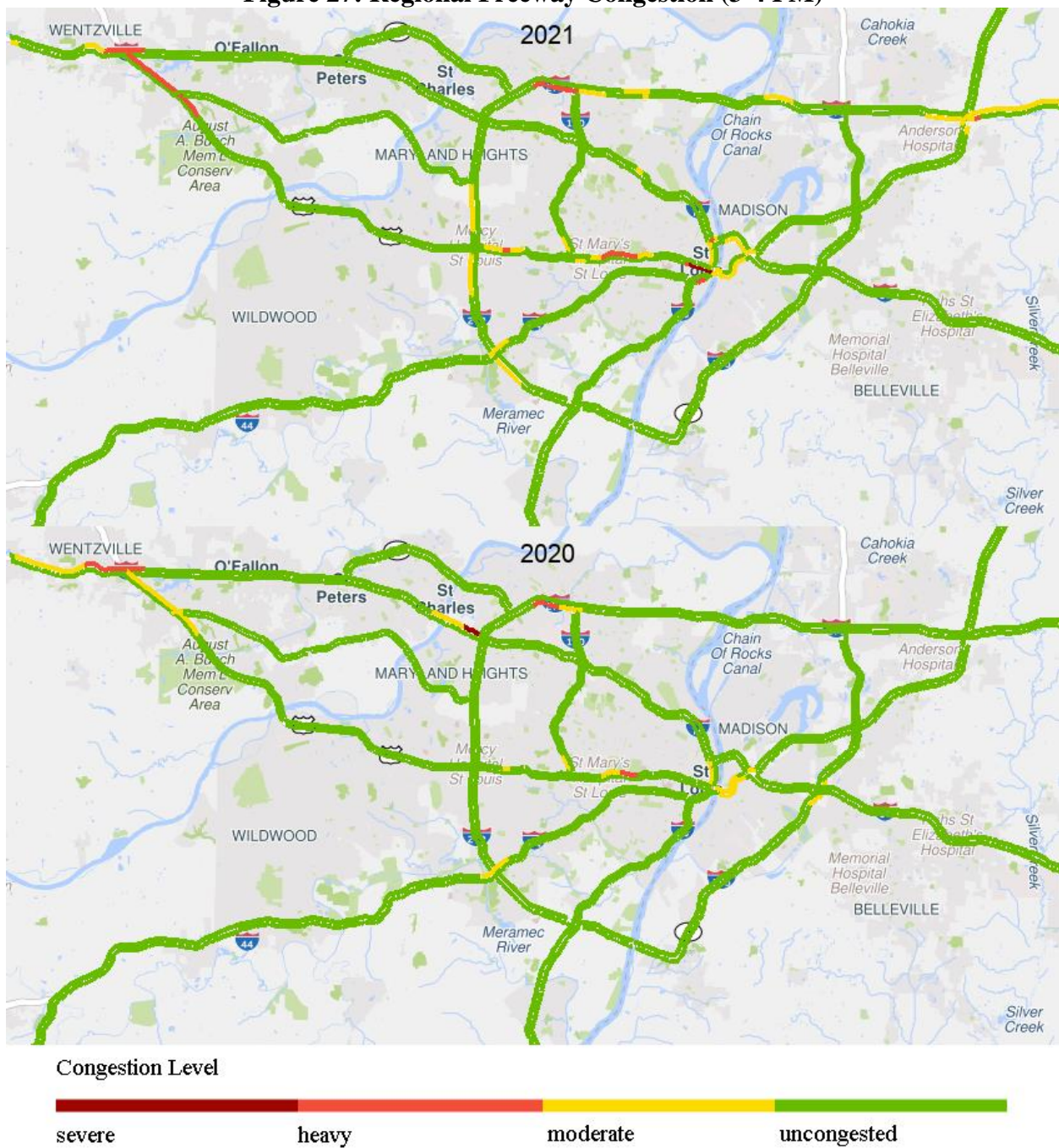


Figure 28: Regional Freeway Congestion (4-5 PM)

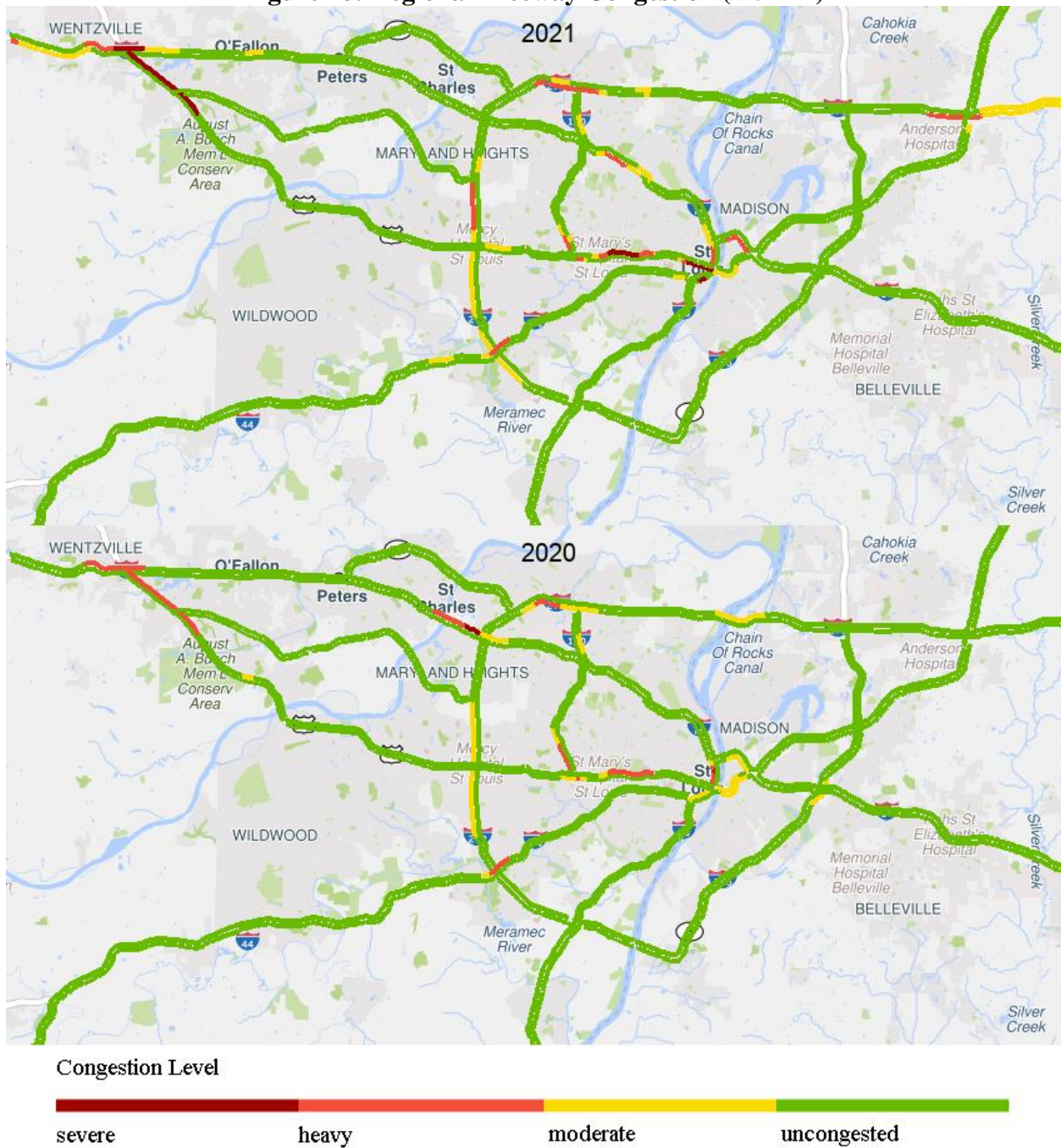
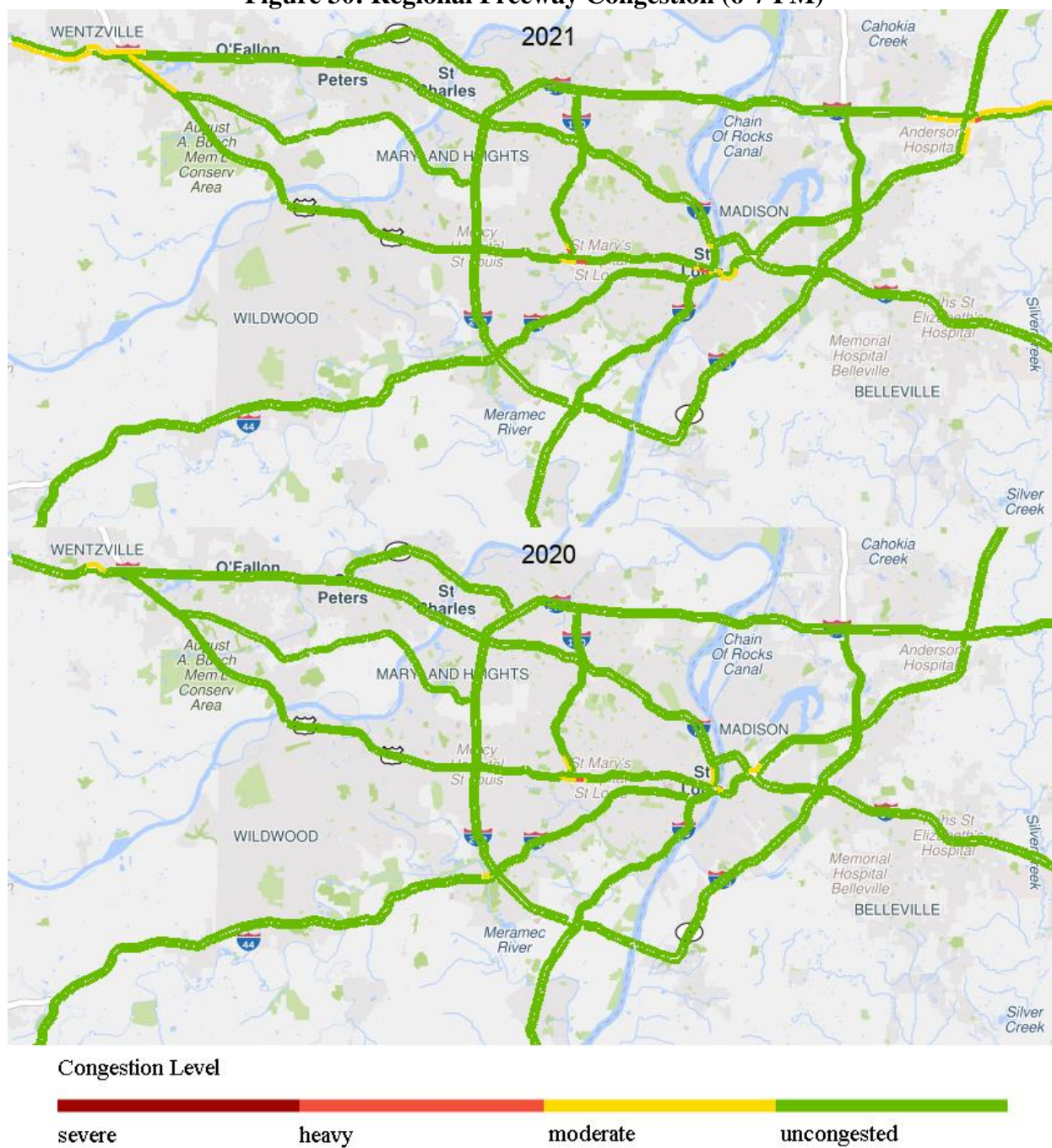


Figure 30: Regional Freeway Congestion (6-7 PM)



3 Mobility-Enhancing Strategies

Following the implementation of mobility-enhancing projects, partners are often required to evaluate strategies to ensure that implemented strategies are effective at addressing congestion as intended. Strategies that significantly improve congestion are encouraged in future project sponsorship.

Due to Covid-19 and irregular traffic volumes, MoDOT's 2021 signal optimization project was delayed and its report is expected to be ready in Fall of 2022. St Charles County's 2021 signal optimization projects were also pushed to 2022.

The following section provides information on IDOT's Signal Coordination and Timing (SCAT) program.

3.1 IDOT's 2020-21 Signal Coordination and Timing (SCAT) Program

IL 159 – Belleville

This project involved developing and field implementing new optimized coordinated signal timing plans for 5 intersections along Illinois Route 159 (IL 159) from Ross Lane / Westhaven School Road to Monroe Street. Table 13 is derived from the project's benefit report and summarizes the benefits based on Synchro modeling results.

Table 13: One-Year Project Benefit Summary

Measure	Before	After	Change	Percent Change
Delay (Hours)	33,042	32,792	-250	-1%
Stops	2,376,576	2,290,073	-86,503	-4%
Fuel Consumption (gallon)	116,742	116,492	-250	0%
Emissions (kg)	1,052,137	1,049,867	-2,270	0%

IL 157 – Caseyville

This project involved developing and field implementing new optimized coordinated signal timing plans for 5 intersections along Illinois Route 157 (IL 157) from Tucker Drive to Bunkum Road. Table 14 is derived from the project's benefit report and summarizes the benefits based on Synchro modeling results.

Table 14: One-Year Project Benefit Summary

Measure	Before	After	Change	Percent Change
Delay (Hours)	33,746	28,210	-5,536	-16%
Stops	3,796,082	3,148,035	-648,047	-17%
Fuel Consumption (gallon)	145,632	133,538	-12,095	-8%
Emissions (kg)	1,312,770	1,203,669	-109,100	-8%

Conclusions

The Covid-19 Pandemic has been by far the overriding factor impacting the status of congestion on the transportation system in the St. Louis region in the last two years. Restrictions implemented to reduce transmission of the virus and control the pandemic caused significant reductions in travel and resulted in reduced traffic volumes across the region.

The most significant finding in this report is that while the value of congestion measures across freeways and arterials in 2021 are higher than 2020, they are still well below 2019 levels.

Tables 15 and 16 summarize the overall changes in performance measures for all congested locations from 2019 to 2021.

Table 15: Comparison of Freeway Congestion Measures between 2019, 2020, and 2021

Measure	2019		2020		2021	
	AM	PM	AM	PM	AM	PM
Total Congested Miles	91.9	174.9	21.4	44.8	5.2	53.5
Average PTI	2.40	2.68	1.99	2.36	2.12	2.42
Average TTI	1.28	1.40	1.16	1.24	1.17	1.32
Average Severity	1.84	2.04	1.57	1.80	1.64	1.87
Average Delay Impact	5.58	9.35	2.80	3.75	2.08	2.93

Table 16: Comparison of Arterial Congestion Measures between 2019, 2020, and 2021

Measure	2019		2020		2021	
	AM	PM	AM	PM	AM	PM
Total Congested Miles	29.6	126	13.7	59.1	3.3	47.9
Average PTI	2.41	2.47	2.04	2.12	2.20	2.18
Average TTI	1.54	1.66	1.47	1.55	1.48	1.56
Average Severity	1.98	2.06	1.76	1.83	1.84	1.87
Average Delay Impact	1.40	1.81	1.10	1.28	0.70	1.32

What's even more striking as a finding, is the significant decrease in total congested miles in the AM peak period across both arterials and freeways. Total arterial congested miles in the PM peak period have also decreased, but the decrease in the AM peak period is much higher. While further investigation can reveal the reason for such significant decrease in total congested miles, one likely explanation is the adaptation of employers and public to the new environment. With the prevalence of remote and flexible working conditions, transportation users can adjust their trip schedule to avoid rush hours.

Appendix

Appendix 1: Ranked Freeway Locations

Table A.1: Freeway Locations Ranked by Severity

No	Route	Limits	State	County	Direction	Peak	Queue Length	PTI	TTI	Severity	Delay Impact
1	I-64	Ewing Ave to Poplar St Bridge	MO	St Louis City	EB	PM	2.07	9.29	3.05	6.17	6.33
2	I-55	Lafayette Ave to 7th St	MO	St Louis City	NB	PM	0.44	3.93	1.59	2.76	0.69
3	I-64	Winghaven Blvd to I-70	MO	St Charles	WB	PM	5.59	3.47	1.59	2.53	8.89
4	I-170	Delmar Blvd to Clayton Rd	MO	St Louis	SB	PM	1.67	2.98	1.37	2.18	2.29
5	I-64	S Boyle Ave to Big Bend Blvd	MO	St Louis City/County	WB	PM	3.94	2.73	1.56	2.15	6.14
6	I-270	MO-367 to Washington St	MO	St Louis	WB	AM	3.69	2.79	1.23	2.01	4.53
7	I-44	I-64 to I-70	MO	St Louis City	EB	PM	1.84	2.65	1.26	1.96	2.31
8	I-70	Lake St Louis Blvd to Wentzville Pkwy	MO	St Charles	WB	PM	5.70	2.48	1.37	1.93	7.81
9	I-64	McKnight Rd to Boland Pl	MO	St Louis	EB	PM	1.71	2.48	1.19	1.84	2.03
10	I-270	James S McDonnell Blvd to Washington St	MO	St Louis	EB	PM	4.48	2.33	1.33	1.83	5.95
11	I-44	Kirkwood Rd to I-270	MO	St Louis	WB	PM	1.49	2.22	1.19	1.71	1.78
12	I-64	Hampton Ave to McCausland Ave	MO	St Louis City	WB	AM	1.08	2.21	1.13	1.67	1.23
13	I-70	Goodfellow Blvd to Jennings Station Rd	MO	St Louis	WB	PM	0.52	2.12	1.15	1.64	0.60
14	I-270	I-64 to Dougherty Ferry Rd	MO	St Louis	SB	PM	3.81	2.10	1.16	1.63	4.42
15	I-270	IL-159 to I-55	IL	IL	EB	PM	3.04	2.00	1.25	1.63	3.80
16	I-70	Tr Hughes Blvd to MO-K	MO	St Charles	WB	PM	1.19	2.07	1.16	1.62	1.38
17	I-270	Page Ave to Ladue Rd	MO	St Louis	SB	PM	2.86	1.99	1.23	1.61	3.52
18	I-70	Stan Musial Bridge to I-55/I-64 Exit	IL	IL	SB	PM	1.91	1.88	1.18	1.53	2.26
19	I-64	Lindbergh Blvd to New Ballas Rd	MO	St Louis	WB	PM	1.58	1.78	1.15	1.47	1.82
20	I-270	I-44 to Gravois Rd	MO	St Louis	SB	PM	2.10	1.76	1.15	1.46	2.42
21	I-44	Compton Ave to Jefferson Ave	MO	St Louis City	EB	PM	0.73	1.75	1.12	1.44	0.82
22	I-170	I-70 to Airport Rd	MO	St Louis	NB	PM	1.30	1.72	1.13	1.43	1.47
23	I-64	Poplar St Bridge to I-55/64/70 E Split	IL	IL	EB	PM	2.49	1.47	1.19	1.33	2.96
24	I-70	MO-N to MO-U	MO	St Louis	EB	PM	1.52	1.35	1.19	1.27	1.81
25	I-70	St. Charles/Warren County Line to MO-W	MO	St Charles	EB	PM	0.55	1.31	1.22	1.27	0.67
26	I-64	Poplar St Bridge	IL	IL	WB	PM	0.43	1.41	1.12	1.27	0.49
27	I-64	Poplar St Bridge	IL	IL	EB	AM	0.42	1.35	1.16	1.26	0.49
28	I-55/I-70	Edwardsville Rd to I-55/I-70 Split	IL	IL	EB	PM	0.50	1.32	1.18	1.25	0.60

Table A.2: Freeway Locations Ranked by Delay Impact

No	Route	Limits	State	County	Direction	Peak	Queue Length	PTI	TTI	Severity	Delay Impact
1	I-64	Winghaven Blvd to I-70	MO	St Charles	WB	PM	5.59	3.47	1.59	2.53	8.89
2	I-70	Lake St Louis Blvd to Wentzville Pkwy	MO	St Charles	WB	PM	5.70	2.48	1.37	1.93	7.81
3	I-64	Ewing Ave to Poplar St Bridge	MO	St Louis City	EB	PM	2.07	9.29	3.05	6.17	6.33
4	I-64	S Boyle Ave to Big Bend Blvd	MO	St Louis City/County	WB	PM	3.94	2.73	1.56	2.15	6.14
5	I-270	James S McDonnell Blvd to Washington St	MO	St Louis	EB	PM	4.48	2.33	1.33	1.83	5.95
6	I-270	MO-367 to Washington St	MO	St Louis	WB	AM	3.69	2.79	1.23	2.01	4.53
7	I-270	I-64 to Dougherty Ferry Rd	MO	St Louis	SB	PM	3.81	2.10	1.16	1.63	4.42
8	I-270	IL-159 to I-55	IL	IL	EB	PM	3.04	2.00	1.25	1.63	3.80
9	I-270	Page Ave to Ladue Rd	MO	St Louis	SB	PM	2.86	1.99	1.23	1.61	3.52
10	I-64	Poplar St Bridge to I-55/64/70 E Split	IL	IL	EB	PM	2.49	1.47	1.19	1.33	2.96
11	I-270	I-44 to Gravois Rd	MO	St Louis	SB	PM	2.10	1.76	1.15	1.46	2.42
12	I-44	I-64 to I-70	MO	St Louis City	EB	PM	1.84	2.65	1.26	1.96	2.31
13	I-170	Delmar Blvd to Clayton Rd	MO	St Louis	SB	PM	1.67	2.98	1.37	2.18	2.29
14	I-70	Stan Musial Bridge to I-55/I-64 Exit	IL	IL	SB	PM	1.91	1.88	1.18	1.53	2.26
15	I-64	McKnight Rd to Boland Pl	MO	St Louis	EB	PM	1.71	2.48	1.19	1.84	2.03
16	I-64	Lindbergh Blvd to New Ballas Rd	MO	St Louis	WB	PM	1.58	1.78	1.15	1.47	1.82
17	I-70	MO-N to MO-U	MO	St Louis	EB	PM	1.52	1.35	1.19	1.27	1.81
18	I-44	Kirkwood Rd to I-270	MO	St Louis	WB	PM	1.49	2.22	1.19	1.71	1.78
19	I-170	I-70 to Airport Rd	MO	St Louis	NB	PM	1.30	1.72	1.13	1.43	1.47
20	I-70	Tr Hughes Blvd to MO-K	MO	St Charles	WB	PM	1.19	2.07	1.16	1.62	1.38
21	I-64	Hampton Ave to McCausland Ave	MO	St Louis City	WB	AM	1.08	2.21	1.13	1.67	1.23
22	I-44	Compton Ave to Jefferson Ave	MO	St Louis City	EB	PM	0.73	1.75	1.12	1.44	0.82
23	I-55	Lafayette Ave to 7th St	MO	St Louis City	NB	PM	0.44	3.93	1.59	2.76	0.69
24	I-70	St. Charles/Warren County Line to MO-W	MO	St Charles	EB	PM	0.55	1.31	1.22	1.27	0.67
25	I-70	Goodfellow Blvd to Jennings Station Rd	MO	St Louis	WB	PM	0.52	2.12	1.15	1.64	0.60
26	I-55/I-70	Edwardsville Rd to I-55/I-70 Split	IL	IL	EB	PM	0.50	1.32	1.18	1.25	0.60
27	I-64	Poplar St Bridge	IL	IL	EB	AM	0.42	1.35	1.16	1.26	0.49
28	I-64	Poplar St Bridge	IL	IL	WB	PM	0.43	1.41	1.12	1.27	0.49

Appendix 2: Ranked Arterial Locations

Table A.3: City of St. Louis Arterial Locations Ranked by Severity

No	Route	Limits	State	Direction	Peak	Queue Length	PTI	TTI	Severity	Delay Impact
1	Salisbury St	Florissant Ave to I-70	MO	EB	PM	0.49	3.29	2.01	2.65	0.98
2	Skinker Blvd	Delmar Blvd to Forest Park Pkwy	MO	SB	PM	0.43	3.13	1.85	2.49	0.79
3	Grand Blvd	Chouteau Ave to Park Ave	MO	SB	PM	0.38	3.29	1.62	2.46	0.62
4	Kingshighway Blvd	Lindell Blvd to MO-100	MO	SB	PM	1.28	2.57	1.67	2.12	2.14
5	Grand Blvd	Hall St to I-70	MO	SB	PM	0.39	2.22	1.84	2.03	0.72
6	Market St	14th St to 7th St	MO	EB	PM	0.50	2.46	1.59	2.03	0.79
7	Jefferson Ave	Washington Blvd to Market St	MO	SB	PM	0.30	2.36	1.62	1.99	0.49
8	MO-100	Truman Pkwy to Tucker Blvd	MO	EB	PM	0.33	2.44	1.52	1.98	0.50
9	Kingshighway Blvd	MO-100 to Laclede Ave	MO	NB	PM	1.07	2.36	1.55	1.96	1.66
10	Cole St	I-44 to Tucker Blvd	MO	WB	PM	0.55	2.29	1.61	1.95	0.89
11	Grand Blvd	Hall St to I-70	MO	SB	AM	0.39	2.22	1.61	1.92	0.63
12	Kingshighway Blvd	I-64 to MO-100	MO	SB	AM	0.32	2.25	1.54	1.90	0.49
13	Kingshighway Blvd	I-64 to Laclede Ave	MO	NB	AM	0.60	2.22	1.54	1.88	0.92
14	MO-100	Vandeventer Ave to Kingshighway Blvd	MO	WB	PM	0.96	2.08	1.67	1.88	1.60
15	Grand Blvd	Chouteau Ave to Park Ave	MO	SB	AM	0.38	2.30	1.42	1.86	0.54
16	Salisbury St	Florissant Ave to I-70	MO	EB	AM	0.49	2.30	1.40	1.85	0.68
17	Tucker Blvd	I-70 to 13th Ave	MO	SB	PM	0.34	2.20	1.45	1.83	0.49
18	Grand Blvd	I-64 to Lindell Blvd	MO	NB	PM	0.38	2.11	1.53	1.82	0.58
19	MO-100	Kingshighway Blvd to Vandeventer Ave	MO	EB	PM	0.96	2.00	1.63	1.82	1.56
20	Skinker Blvd	Forest Park Pkwy to Delmar Blvd	MO	NB	PM	0.43	2.00	1.51	1.76	0.64
21	Tucker Blvd	Cole St to Market St	MO	SB	PM	0.57	1.92	1.50	1.71	0.85
22	Cole St	Tucker Blvd to I-44	MO	EB	PM	0.49	1.96	1.46	1.71	0.71
23	Market St	18th St to Jefferson Ave	MO	WB	PM	0.51	1.92	1.42	1.67	0.72
24	Jefferson Ave	Market St to Washington Blvd	MO	NB	PM	0.30	1.92	1.41	1.67	0.43
25	Hampton Ave	Watson Ave to I-44	MO	NB	PM	0.60	1.83	1.47	1.65	0.89
26	Grand Blvd	Gravois Ave to Arsenal St	MO	NB	PM	0.71	1.86	1.44	1.65	0.55
27	MO-D	Goodfellow Blvd to Skinker Pkwy	MO	WB	PM	0.44	1.80	1.38	1.59	0.61
28	Forest Park	Kingshighway Blvd to Vandeventer Ave	MO	EB	PM	1.30	1.69	1.37	1.53	1.78

Table A.4: City of St. Louis Arterial Locations Ranked by Delay Impact

No	Route	Limits	State	Direction	Peak	Queue Length	PTI	TTI	Severity	Delay Impact
1	Kingshighway Blvd	Lindell Blvd to MO-100	MO	SB	PM	1.28	2.57	1.67	2.12	2.14
2	Forest Park	Kingshighway Blvd to Vandeventer Ave	MO	EB	PM	1.30	1.69	1.37	1.53	1.78
3	Kingshighway Blvd	MO-100 to Laclede Ave	MO	NB	PM	1.07	2.36	1.55	1.96	1.66
4	MO-100	Vandeventer Ave to Kingshighway Blvd	MO	WB	PM	0.96	2.08	1.67	1.88	1.60
5	MO-100	Kingshighway Blvd to Vandeventer Ave	MO	EB	PM	0.96	2.00	1.63	1.82	1.56
6	Salisbury St	Florissant Ave to I-70	MO	EB	PM	0.49	3.29	2.01	2.65	0.98
7	Kingshighway Blvd	I-64 to Laclede Ave	MO	NB	AM	0.60	2.22	1.54	1.88	0.92
8	Cole St	I-44 to Tucker Blvd	MO	WB	PM	0.55	2.29	1.61	1.95	0.89
9	Hampton Ave	Watson Ave to I-44	MO	NB	PM	0.60	1.83	1.47	1.65	0.89
10	Tucker Blvd	Cole St to Market St	MO	SB	PM	0.57	1.92	1.50	1.71	0.85
11	Market St	14th St to 7th St	MO	EB	PM	0.50	2.46	1.59	2.03	0.79
12	Skinker Blvd	Delmar Blvd to Forest Park Pkwy	MO	SB	PM	0.43	3.13	1.85	2.49	0.79
13	Market St	18th St to Jefferson Ave	MO	WB	PM	0.51	1.92	1.42	1.67	0.72
14	Grand Blvd	Hall St to I-70	MO	SB	PM	0.39	2.22	1.84	2.03	0.72
15	Cole St	Tucker Blvd to I-44	MO	EB	PM	0.49	1.96	1.46	1.71	0.71
16	Salisbury St	Florissant Ave to I-70	MO	EB	AM	0.49	2.30	1.40	1.85	0.68
17	Skinker Blvd	Forest Park Pkwy to Delmar Blvd	MO	NB	PM	0.43	2.00	1.51	1.76	0.64
18	Grand Blvd	Hall St to I-70	MO	SB	AM	0.39	2.22	1.61	1.92	0.63
19	Grand Blvd	Chouteau Ave to Park Ave	MO	SB	PM	0.38	3.29	1.62	2.46	0.62
20	MO-D	Goodfellow Blvd to Skinker Pkwy	MO	WB	PM	0.44	1.80	1.38	1.59	0.61
21	Grand Blvd	I-64 to Lindell Blvd	MO	NB	PM	0.38	2.11	1.53	1.82	0.58
22	Grand Blvd	Gravois Ave to Arsenal St	MO	NB	PM	0.71	1.86	1.44	1.65	0.55
23	Grand Blvd	Chouteau Ave to Park Ave	MO	SB	AM	0.38	2.30	1.42	1.86	0.54
24	MO-100	Truman Pkwy to Tucker Blvd	MO	EB	PM	0.33	2.44	1.52	1.98	0.50
25	Jefferson Ave	Washington Blvd to Market St	MO	SB	PM	0.30	2.36	1.62	1.99	0.49
26	Kingshighway Blvd	I-64 to MO-100	MO	SB	AM	0.32	2.25	1.54	1.90	0.49
27	Tucker Blvd	I-70 to 13th Ave	MO	SB	PM	0.34	2.20	1.45	1.83	0.49
28	Jefferson Ave	Market St to Washington Blvd	MO	NB	PM	0.30	1.92	1.41	1.67	0.43

Table A.5: St. Louis County Arterial Locations Ranked by Severity

No	Route	Limits	State	Direction	Peak	Queue Length	PTI	TTI	Severity	Delay Impact
1	MO-AC	Old Halls Ferry Rd to Dunn Rd	MO	NB	PM	0.69	3.43	1.74	2.59	1.20
2	US-67	St Ferdinand St to Washington St	MO	SB	PM	0.67	3.20	1.77	2.49	1.19
3	MO-340	Chesterfield Pkwy to Baxter Rd	MO	SB	PM	0.38	2.69	1.81	2.25	0.69
4	MO-100	MO-141 to Baxter Rd	MO	WB	PM	0.60	2.69	1.67	2.18	1.01
5	MO-30	Sappington Rd to Lindbergh Blvd	MO	WB	PM	0.34	2.38	1.64	2.01	0.55
6	MO-100	Henry Ave to Woods MO-141	MO	EB	PM	0.45	2.31	1.67	1.99	0.76
7	MO-30	Lindbergh Blvd to Sappington Rd	MO	EB	PM	0.34	2.29	1.66	1.98	0.56
8	MO-21	Lindbergh Blvd to Butler Hill Rd	MO	SB	PM	2.61	2.19	1.60	1.90	4.18
9	MO-D	I-170 to Woodson Rd	MO	WB	PM	0.36	2.21	1.55	1.88	0.55
10	MO-100	MO-340 to Old State Rd	MO	WB	PM	0.54	2.11	1.62	1.87	0.87
11	St Ferdinand St	Lindbergh Blvd to Washington St	MO	SB	PM	0.44	2.16	1.54	1.85	0.67
12	MO-100	Big Bend Blvd to McCausland Ave	MO	EB	PM	0.83	2.00	1.70	1.85	1.41
13	US-67	Washington St to Patterson Rd	MO	NB	PM	0.37	2.14	1.52	1.83	0.56
14	MO-21	Butler Hill rd to I-270	MO	NB	PM	1.50	2.01	1.57	1.79	2.35
15	US-67	New Florissant Rd to Old Halls Ferry Rd	MO	NB	PM	2.19	1.97	1.56	1.77	3.41
16	US-61	I-55 to Lemay Ferry Rd	MO	SB	PM	0.59	1.94	1.56	1.75	0.92
17	US-67	New Halls Ferry Rd to New Florissant Rd	MO	SB	PM	1.11	1.88	1.40	1.64	1.56
18	MO-366	Lindbergh Blvd to Geyer Rd	MO	WB	PM	0.44	1.84	1.36	1.60	0.59
19	US-61	Big Bend Rd to I-44	MO	SB	PM	0.52	1.76	1.37	1.57	0.71
20	MO-100	McCausland Ave to Big Bend Blvd	MO	WB	PM	0.83	1.69	1.42	1.56	1.18
21	US-61	Lemay Ferry Rd to I-55	MO	NB	PM	0.67	1.73	1.37	1.55	0.92
22	MO-100	Old State Rd to MO-340	MO	EB	PM	0.54	1.72	1.36	1.54	0.73

Table A.6: St. Louis County Arterial Locations Ranked by Delay Impact

No	Route	Limits	State	Direction	Peak	Queue Length	PTI	TTI	Severity	Delay Impact
1	MO-21	Lindbergh Blvd to Butler Hill Rd	MO	SB	PM	2.61	2.19	1.60	1.90	4.18
2	US-67	New Florissant Rd to Old Halls Ferry Rd	MO	NB	PM	2.19	1.97	1.56	1.77	3.41
3	MO-21	Butler Hill rd to I-270	MO	NB	PM	1.50	2.01	1.57	1.79	2.35
4	US-67	New Halls Ferry Rd to New Florissant Rd	MO	SB	PM	1.11	1.88	1.40	1.64	1.56
5	MO-100	Big Bend Blvd to McCausland Ave	MO	EB	PM	0.83	2.00	1.70	1.85	1.41
6	MO-AC	Old Halls Ferry Rd to Dunn Rd	MO	NB	PM	0.69	3.43	1.74	2.59	1.20
7	US-67	St Ferdinand St to Washington St	MO	SB	PM	0.67	3.20	1.77	2.49	1.19
8	MO-100	McCausland Ave to Big Bend Blvd	MO	WB	PM	0.83	1.69	1.42	1.56	1.18
9	MO-100	MO-141 to Baxter Rd	MO	WB	PM	0.60	2.69	1.67	2.18	1.01
10	US-61	Lemay Ferry Rd to I-55	MO	NB	PM	0.67	1.73	1.37	1.55	0.92
11	US-61	I-55 to Lemay Ferry Rd	MO	SB	PM	0.59	1.94	1.56	1.75	0.92
12	MO-100	MO-340 to Old State Rd	MO	WB	PM	0.54	2.11	1.62	1.87	0.87
13	MO-100	Henry Ave to Woods MO-141	MO	EB	PM	0.45	2.31	1.67	1.99	0.76
14	MO-100	Old State Rd to MO-340	MO	EB	PM	0.54	1.72	1.36	1.54	0.73
15	US-61	Big Bend Rd to I-44	MO	SB	PM	0.52	1.76	1.37	1.57	0.71
16	MO-340	Chesterfield Pkwy to Baxter Rd	MO	SB	PM	0.38	2.69	1.81	2.25	0.69
17	St Ferdinand St	Lindbergh Blvd to Washington St	MO	SB	PM	0.44	2.16	1.54	1.85	0.67
18	MO-366	Lindbergh Blvd to Geyer Rd	MO	WB	PM	0.44	1.84	1.36	1.60	0.59
19	MO-30	Lindbergh Blvd to Sappington Rd	MO	EB	PM	0.34	2.29	1.66	1.98	0.56
20	US-67	Washington St to Patterson Rd	MO	NB	PM	0.37	2.14	1.52	1.83	0.56
21	MO-D	I-170 to Woodson Rd	MO	WB	PM	0.36	2.21	1.55	1.88	0.55
22	MO-30	Sappington Rd to Lindbergh Blvd	MO	WB	PM	0.34	2.38	1.64	2.01	0.55

Table A.7: St. Charles County Arterial Locations Ranked by Severity

No	Route	Limits	State	Direction	Peak	Queue Length	PTI	TTI	Severity	Delay Impact
1	Mexico Rd	I-70 to Jungermann Rd	MO	WB	PM	0.88	2.24	1.57	1.91	1.38
2	Mid Rivers Mall Dr	MO-364 to Central School Rd	MO	NB	PM	0.51	2.22	1.58	1.9	0.80
3	MO-94	Friedens Rd to Pralle Ln	MO	SB	PM	0.61	2.15	1.41	1.78	0.86
4	MO-K	I-70 to MO-364	MO	SB	PM	3.50	1.89	1.49	1.69	5.22
5	MO-94	5th St to I-70	MO	SB	PM	1.99	1.79	1.45	1.62	2.88

Table A.8: St. Charles County Arterial Locations Ranked by Delay Impact

No	Route	Limits	State	Direction	Peak	Queue Length	PTI	TTI	Severity	Delay Impact
1	MO-K	I-70 to MO-364	MO	SB	PM	3.50	1.89	1.49	1.69	5.22
2	MO-94	5th St to I-70	MO	SB	PM	1.99	1.79	1.45	1.62	2.88
3	Mexico Rd	I-70 to Jungermann Rd	MO	WB	PM	0.88	2.24	1.57	1.91	1.38
4	MO-94	Friedens Rd to Pralle Ln	MO	SB	PM	0.61	2.15	1.41	1.78	0.86
5	Mid Rivers Mall Dr	MO-364 to Central School Rd	MO	NB	PM	0.51	2.22	1.58	1.9	0.80

Table A.9: Jefferson County Arterial Locations Ranked by Severity

No	Route	Limits	State	Direction	Peak	Queue Length	PTI	TTI	Severity	Delay Impact
1	MO-141	Old Lemay Ferry Rd to Jeffco Blvd	MO	NB	PM	0.84	2.07	1.62	1.85	1.36
2	MO-141	Old Lemay Ferry Rd to I-55	MO	NB	AM	0.37	1.88	1.38	1.63	0.51

Table A.10: Jefferson County Arterial Locations Ranked by Delay Impact

No	Route	Limits	State	Direction	Peak	Queue Length	PTI	TTI	Severity	Delay Impact
1	MO-141	Old Lemay Ferry Rd to Jeffco Blvd	MO	NB	PM	0.84	2.07	1.62	1.85	1.36
2	MO-141	Old Lemay Ferry Rd to I-55	MO	NB	AM	0.37	1.88	1.38	1.63	0.51

Table A.11: Illinois Counties Arterial Locations Ranked by Severity

No	Route	Limits	State	Direction	Peak	Queue Length	PTI	TTI	Severity	Delay Impact
1	IL-159	I-64 to Frank Scott Pkwy	IL	SB	PM	1.80	2.25	1.64	1.95	2.95
2	IL-15	IL-13 to Green Mount Rd	IL	EB	PM	0.77	2.16	1.55	1.86	1.20
3	IL-15	IL-13 to Green Mount Rd	IL	EB	AM	0.77	2.25	1.45	1.85	1.12
4	IL-159	I-270 to Governors Pkwy	IL	NB	PM	2.20	2.12	1.53	1.83	3.36
5	IL-159	Frank Scott Pkwy to I-64	IL	NB	PM	2.05	1.99	1.49	1.74	3.06
6	IL-159	Lebanon Ave to S Belt E	IL	SB	PM	1.14	1.91	1.43	1.67	1.63
7	IL-203	Pontoon Rd to Madison Ave	IL	SB	PM	0.92	1.67	1.42	1.55	1.30

Table A.12: Illinois Counties Arterial Locations Ranked by Delay Impact

No	Route	Limits	State	Direction	Peak	Queue Length	PTI	TTI	Severity	Delay Impact
1	IL-159	I-270 to Governors Pkwy	IL	NB	PM	2.20	2.12	1.53	1.83	3.36
2	IL-159	Frank Scott Pkwy to I-64	IL	NB	PM	2.05	1.99	1.49	1.74	3.06
3	IL-159	I-64 to Frank Scott Pkwy	IL	SB	PM	1.80	2.25	1.64	1.95	2.95
4	IL-159	Lebanon Ave to S Belt E	IL	SB	PM	1.14	1.91	1.43	1.67	1.63
5	IL-203	Pontoon Rd to Madison Ave	IL	SB	PM	0.92	1.67	1.42	1.55	1.30
6	IL-15	IL-13 to Green Mount Rd	IL	EB	PM	0.77	2.16	1.55	1.86	1.20
7	IL-15	IL-13 to Green Mount Rd	IL	EB	AM	0.77	2.25	1.45	1.85	1.12

Appendix 3: 2021 Major Congestion Impact Highway Work Zones

We obtained the data on Missouri work zones from 2021 MoDOT, St. Louis District's Quarterly Mobility Reports. These reports define major impact work zones as those with additional travel time impacts of more than 15 minutes. Based on these reports, the following are the three major impact highway work zones,

- Eastbound I-270 Design Build
Type of project: Roadway Rehab Construction
Impact: RITIS data recorded additional travel times up to 51 minutes
- Westbound I-270 Design Build
Type of project: Roadway Rehab Construction
Impact: RITIS data recorded additional travel times up to 71 minutes
- Westbound I-44 Bridge rehab
Type of project: Bridge Rehab Construction
Impact: RITIS data recorded additional travel times up to 17 minutes

Data on Illinois work zones was obtained from IDOT. IDOT's staff defined major impact work zones as those that caused the most delay. These work zones have additional travel time impacts of more than 15 minutes and are as follows,

- Poplar Street Complex C-D Lanes
Type of project: Deck Replacement
- I-55/70/270 (3-I)
Type of project: Patching, Milling, Resurfacing
- IL 140/111 over Quarry Spur, Alton
Type of project: Deck Replacement
- IL 255 over Cahokia Diversion Canal
Type of project: Bridge Repairs and Overlay
- IL 3 from Cahokia to Sauget
Type of project: Patching, Resurfacing (This project started with patching in 2021 and will continue with resurfacing in 2022.)



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